

# LUISS



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## **INCIDENCE OF ESG FACTORS ON THE FINANCIAL PERFORMANCE OF AIRLINE COMPANIES**

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*“Creating a strong business and building a better world are not conflicting goals – they are both essential ingredients for long-term success.”*

William Clay Ford Jr.

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## INTRODUCTION

Nowadays, it has become imperative to consider a company together with the context in which it operates. The current situation is certainly geared toward a sustainable market perspective. The concept of sustainability, which originated in the 1950s, has only recently become much more widespread. Every type of industry has been affected by this new trend that has dictated the new market rules. Despite the recognized importance on the subject, the goal of a company is still to make profit, which is why the question about financial performance arises. Do corporate social responsibility strategies lead to better financial performance for the company? General interest in the topic has also stimulated the curiosity of investors that demand more transparency from companies about their practices. For this reason, it was necessary to develop rankings that could assess performance and assign scores to companies regarding their environmental, social and governance (ESG) practices. Lately, the ESG rankings moved from a minor to a major role even in the decision-making of private investors. This work sets out to analyze these and other aspects of ESG factors and CSR practices with a special focus on the airline industry.

The choice to analyze the airline industry stems from the importance it has for social progress and the evidence that sustainability has been taking on recently for this sector. Moreover, this market has a strong dependency on macro trends such as globalization, sustainability, and pandemics. The majority of ESG practices adopted by airlines are focused on environmental concerns, especially regarding the reduction of CO<sub>2</sub> emissions. However, while the economic and social advantages of global air transportation are evident, the aviation industry's environmental costs and externalities are enormous (Schipper, Rietveld & Nijkamp, 2001; Upham, Maughan, Raper & Thomas, 2012).

Through a thorough review of the literature and a framing of the airline industry, the study will proceed with an empirical analysis to explore the relationship between ESG factors and financial performance for the airlines. The work is structured as follows:

The first chapter deals with outlining a theoretical framework regarding the latest trends on sustainability and corporate social responsibility. It also brings attention to environmental, social and governance (ESG) factors. The literature on the relationship between corporate social performance (CSP) and corporate financial performance (CFP) is then introduced.

The second chapter provides an overview of the airline industry, analyzing it from the perspective of sustainability. It also presents literature studies similar to the topic investigated by this research.

The third and final chapter deals with the empirical analysis carried out on a sample of airlines. A description of the methodology used in the research is presented together with the explanation of its variables. The study uses a statistical regression model that compares the relationship between CSR measured by ESG ranking values and CFP measured by ROA/ROE. A further T-test analysis will be done to investigate a possible difference in average financial performance between airlines with a high score and those with a low score.

The discussion concludes with an analysis of the results and limitations of the model. Finally, a comparison is made with the existing literature on the subject and suggestions are provided for further research on the topic.



# CHAPTER 1 Theoretical Framework: CSR and ESG Factors

## 1.1 Corporate Social Responsibility

Nowadays, companies do not act in isolation; they live in an ecosystem where social factors may limit their markets and the productivity of their stakeholders (Kramer & Pfitzer, 2016). The modern companies are complex systems whose actors are involved in a dense and varied network of relationships and the actions of each influence the choices of the others. Several authors have pointed out that the company's actions are transmitted to the entire network of relationships, encompassing every actor in it, and are amplified, both positively and negatively, depending on how the company behaves towards each stakeholder. (Harrison and Wicks, 2013) From this perspective, the debates on sustainability and Corporate Social Responsibility (CSR) take on a richer significance. Over the past three decades, also the literature has given a considerable attention to sustainability and to the companies' implications that derive from it, more in particular, which is the relationship between corporate social responsibility and financial performance.

The neoclassical paradigm of the efficient, self-regulating market has now been replaced by many economists (Fama, 1970; Sen, 1988); and the corrective function that CSR can have in a market with strong information asymmetries was recognized accordingly (Moskowitz, 1972, 1975). Recently, there has been an increase in demand for Corporate Social Responsibility activities, however the cost-effectiveness aspect of corporate action remains relevant, and it must not destroy value. What has changed from the past, is the remuneration of the various production factors whose value varies over time and with the general cultural evolution of public perception of the corporation, its goals, and its function. For this reason, the environmental issue appears to be increasingly important, since the environment has become a significant stakeholder capable of influencing the current value of the company (Pellegrini, Dallochio, Parazzini, 2020). As a result, the number of industry leaders or consulting firms that provide CSR research, environmental, social, and governance (ESG) indices, expert advice, and ratings has increased significantly.

However, the notion of CSR has a long and extensive literature (Mosca & Civera, 2017), with roots dating back to the 1950s in both the United States and Europe (Carrol 1999). Howard Bowen, known as the "Father of Corporate Social Responsibility," defined CSR as "the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society" (Bowen,

1953). The work of Carroll (1999) features the development of the CSR concept with the help of a pyramid to illustrate how a socially responsible company should make a profit, obey the law, be ethical and a good example of corporate citizenship.



Figure 1: Carroll’s Corporate Social Responsibility pyramid (1991)

According to Carroll (2008), the entire concept of CSR in this early time was related to corporate philanthropy. Since then, CSR has evolved from philanthropy to regulated practices and finally to instrumental/strategic CSR. Corporations are increasingly being pressured to comply with environmental rules, transparency, and the market is flooded with rivals in the new century, forcing the use of CSR as a strategy to survive and be more efficient (Glan, 2006). With the government and civil society, business creates an essential triangle relationship. Each has a unique system that allows them to coordinate their actions and play a certain function in society. In general, the government is in charge of enacting and maintaining legislation (control), business is in charge of producing wealth through competition and collaboration (market), and civil society is in charge of structuring and shaping society via collective action and involvement.

The CSR history and its literature are extensive and multi-faceted. According to Votaw and Sethi (1973), “Social responsibility means something, but not always the same thing to everybody”. Corporate social responsibility (CSR) is defined by McWilliams and Siegel (2001) as “actions that appear to further some social good, beyond the interests of the firm and that which is required by law”.

The concept of complementarity explained in the Milgrom and Roberts work (1995), could summarize the interaction between different dimensions of CSR. It is based on the idea that the marginal value of one CSR dimension increases as the level of another CSR component rises (Cavaco and Crifo, 2014). Looking at these examples it could be said that CSR has the characteristic to be multi-faceted and to imply multi-dimensional decisions (Griffin and Mahon, 1997; Waddock and Graves, 1997). Many researchers categorize these many different CSR activities into three main pillars called ESG factors: environmental, social and corporate governance.

There are fundamentally two conflicting perspectives that have characterized the evolution of the idea of Corporate Social Responsibility over time: the Shareholders Value Theory and the Stakeholders Value Theory. The Shareholders Value Theory prioritizes the creation of value and profit for the organization's shareholders, in this case CSR policies are implemented only if they can generate value for them. The Stakeholders Value Theory, on the other hand, aims to produce value for the company's whole group of stakeholders and it is more related to the concept of CSR (Freeman, 2004). According to this theory, the better a company handles its relationships with its stakeholders, the more successful it will be in the long run (Barnett & Salomon, 2012). Consequently, companies have begun to see themselves as part of a larger economic system and have begun to reveal their CSR activities through a measurement of their environmental, social, and governance (ESG) performance. Stakeholders are often skeptical of a company's efforts in the sphere of social responsibility, since in many cases they are seen only as a way of gaining a reputational advantage over competitors (Laufer, 2003).

## **1.2 CSR and Financial Performance**

### **1.2.1 Definition of the Two Quantities**

One of the major issues related to CSR is how its activities affect the financial performance of a company. The discussion about the link between corporate social responsibility (CSR) and corporate financial performance (CFP) has been fueling the debate among academics for a long time now (Alexander & Buchholz, 1978).

There is yet to be an agreement on whether CSR improves financial performances. As a result, many academics believe that further research is needed before this link can be properly appreciated (Griffin and Mahon, 1997; Rowley and Berman, 2000; Surroca et al., 2010). Many publications and works have investigated whether CSR leads to better financial success or

whether financial performance is a required condition for CSR activities to be implemented. All these considerations are also in line with the increasing attention that corporate finance studies are giving to non-financial information in influencing stock performance.

There are several reasons for the difficulty to develop a consensus on the implications of better social performance on financial performance. One of them is the theoretical expectations of the Corporate Social Performance (CSP), as well as its conceptual drivers, that are yet underdeveloped (Wood and Jones, 1995; Rowley and Berman, 2000; Margolis and Walsh, 2003). CSP is a multidimensional concept that includes a wide spectrum of corporate behavior in terms of resources, procedures, and outcomes (Carroll, 1979; Waddock and Graves, 1997). As a result, fundamentally distinct components of CSP may be expected to be influenced in various ways, with different implications for financial success. Wood (1991) developed a definition of CSP by understanding and reviewing the literature on the subject up to that point: “*A business organization’s configuration of principles of social responsibility, processes of social responsiveness, and policies, programs, and observable outcomes as they relate to the firm’s societal relationships*”. Furthermore, recent conceptual and empirical work has suggested that the relationship between social and financial success must be viewed as dependent on a range of contextual characteristics, such as a firm's size, industrial climate, and the closeness of these to the specific social efforts undertaken (Rowley and Berman, 2000; Margolis and Walsh, 2003). Thereby, when studying the link between them, it is critical to adjust for contextual factors, industry impacts and the existence of research and development (R&D) and advertising expenditures, as suggested by McWilliams and Siegel (2000). Moreover, the variety of results present in the literature is also due to the complexity of measuring CSP (Waddock and Graves, 1997; Griffin and Mahon, 1997). On the other hand, CFP is easier to measure because very often the data are public from companies’ balance sheets. The financial measures most used to calculate CFP in the academic works are *Tobin’s q* ratio, return on equity (ROE), return on sales, growth in sales and return on asset (ROA). *Tobin’s q* is a ratio between a physical asset’s market value and its replacement value. Return on equity is defined as earnings before taxes divided by total stockholders’ equity. Return on sales is a ration defined as net income before taxes divided by sales. Growth in sales is measured by the percent change in sales from one year to the next. Finally, the return on assets (ROA) refers to a financial ratio that indicates company profitability in relation to its total assets.

The way the CSR and CFP concepts are operationalized and quantified is one of the most generally recognized reasons for the ambiguous empirical outcomes. Profitability ratios

derived from financial accounts that are somewhat standardized and widely available are often used to assess CFP.

CSR measurement, on the other hand, is significantly more problematic for a variety of reasons. Both theoretical and methodological concerns are responsible for the contradictory results. Absence of a theoretical foundation, lack of a comprehensive systematic measure of CSP, lack of methodological rigor, sample size and composition restrictions, and mismatch between social and financial variables are among the reasons (Cochran and Wood, 1984; McGuire et al., 1988; Wood and Jones, 1995). Finally, few prior studies explicitly evaluate the temporal horizon across which CSP and CFP are associated in their research.

### **1.2.2 Relationship Between CSP and CFP**

The results produced by many studies on the relationship between CSR/ESG practice and financial performance are not homogeneous but rather mixed (McWilliams et al., 2006). The relationship between the two variables is not simply cause and effect but it involves many factors and aspects to be considered. The previous literature about this relationship is divided into two currents of thoughts, those that argue a positive correlation and those that argue a negative one. The first study stream concludes that the increased money generated through CSR practices outweighs the costs. Some academics, on the other hand, claims that the expenditures of doing CSR operations outweigh the returns, resulting in a profit drop.

Al-tuwajiri et al. (2004) argue a positive relationship between environmental performance and the economic one, the study also links these findings with Micheal Porter's thesis that innovation aimed at reducing inefficiencies caused by pollution helps to promote competitiveness in the marketplace. Waddock and Graves 's study (1997) also found that financial performance depends on social performance, they also showed that the opposite case where a better social performance depends on the financial one is also true. The meta-analysis carried out by Orlitzky, Schmidt, and Rynes, 2003 agrees with the statement of a positive association between CSP and CFP. It also adds that this relationship can vary in intensity due to the contingencies of reputation or CSP disclosures (Berman, 2000).

The opposite view on the topic is supported by those who argue a negative relationship between CSR and CFP. Milton Friedman (1970) argued that the expected cost of environmental responsibility outweighs its benefits and consequently has a negative impact, eroding the profitability of the company. The theory that the negative impact on performance cannot be separated from the context in which firms operate, is consistent with the hypothesis that the

more environmental standards are incorporated into state laws, the greater the potential for loss in financial performance. According to Canon-de-Francia (2009) the result of the analysis highlights that possession of ISO 14001 certification (an international standard that lays out the requirements for a successful environmental management system (EMS)) generates negative returns for the shares of the companies considered, since the market does not consider this certification as an indicator of a greater capacity for companies to attract resources and create competitive advantages. In conclusion, the conflict that companies face is between the desire to increase sustainable actions and the company's intrinsic drive to minimize costs. (Karaibrahimoglu 2010).

There are many researchers in the debate who position themselves in the middle either with a mixed perspective or by not finding an effective correspondence between CSP and CFP. For example, Brammer (2005) highlights a positive impact on the stock for companies active in the social context and in policies in favor of employees; while he states that investments in the environmental sector would have negative effects on the performance of the stock. According to Aupperle and Carroll (1985), no relevant correlation has been found between social performance measures and adjusted return on assets (ROA). Same point of view for Mahapatra (1984) that argue that environment and business profitability are not correlated with each other. Nevertheless, according to many others the results cannot be generalized to all markets and industries (Varenova et al. 2013). Furthermore, Cavaco and Crifo (2014) have highlighted how the relationship between CSR practices and CFP can be split into two different phenomena: CSR practices can lead to higher financial performance when they are complementary practices (existence of synergies), while lower financial performance when they are substitutable practices (trade-off between CSR components).

Brammer and Millington (2008) in their work highlighted the current knowledge on the relationship between social and financial success by defining four descriptive models. These models differ based on three assumptions: whether there are positive financial payoffs for good social performance; whether such payoffs derive from a firm's absolute level of social performance or from its performance relative to peers; and whether such payoffs are subject to diminishing returns.

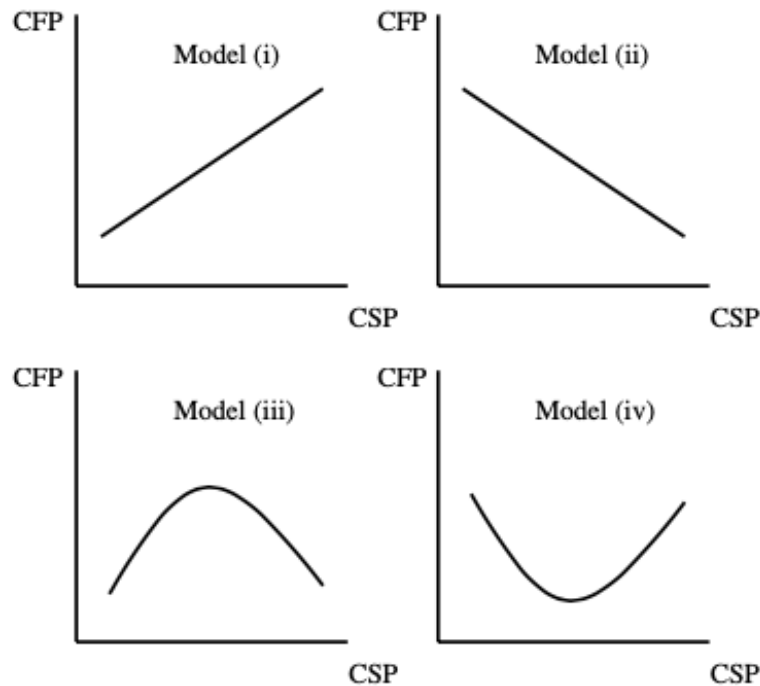


Figure 2: Alternative models of relationship between Corporate financial performance and Corporate social performance (Brammer and Millington, 2008)

Model (i) proposes a positive link between CFP and CSP, based on the notion that a firm's social performance has financial advantages that do not decline with time. Existing contributions in the neoclassical economic theory have suggested that greater social performance may lead to improved financial performance by either decreasing costs or boosting revenues (Navarro, 1988; McWilliams and Siegel, 2000).

Stakeholder theory has been used to examine the relationship between CSP and CFP. An important strand of stakeholder theory is instrumental stakeholder theory, which emphasizes that successful management of key stakeholder relationships may lead to improved financial performance by creating, developing, or maintaining links that give vital resources to organizations (Jones, 1995). According to stakeholder theory, shareholders are one of the many stakeholder groups that managers must consider when making decisions (Donaldson and Preston, 1995; Wood and Jones, 1995). Proactively investing in stakeholders' desires, firms obtain a competitive advantage by creating additional, complementary skills that are extremely difficult to copy by competitors. (Russo and Fouts, 1997). Better CSP should translate into better financial performance in any scenario, whether it is due to lower costs or more revenues. Understanding the link between CSP and financial success requires first recognizing that a

corporation has implicit and explicit contracts with various stakeholders. Because stakeholder expectations may contradict, firms must weigh the costs and advantages of making trade-offs due to limited resources. In order to understand the firm's effectiveness at making trade-offs, the measure for these multiple contracts must reflect the numerous CSP variables as well as the weight given to those aspects by the stakeholder group of interest (Ruf et al., 1998).

Model (ii), on the other hand, is based on alternative conceptual frameworks that argue for a linear negative relationship between corporate social and financial success, implying that there are no financial benefits from strong social performance. The prevailing criticism of social performance comes from the principal-agent paradigm (Jensen and Meckling, 1976). The principal-agent model considers situations in which one individual or group (the principals) delegate authority to another individuals or group (the agents) and the welfare of the former is dependent on the latter's actions (Jensen and Meckling, 1976; Williamson, 1964). Principals are frequently linked with owners or shareholders in a business environment, and agents with senior managers. This implies that principals can only imperfectly monitor or manage agents, and that the two parties' preferences on a specific choice may differ. According to it, managers might opportunistically utilize corporate resources to pursue goals that increase their personal utility in ways that are unlikely to offer considerable returns to corporations (Navarro, 1988; Williamson, 1964). As a result, excellent social performance comes at the cost of good financial performance, because social performance uses company resources in ways that provide large management advantages rather than allocating those resources to other investment projects or returning them to shareholders.

Nonlinear interactions between CFP and CSP are described by models (iii) and (iv). Model (iii) implies that high social performance has positive financial payoffs, but that these payoffs are subject to declining, and eventually decreasing, returns. Some literature argue that the financial consequences of enhanced social performance are dependant on the extent or extent of social responsibility that a corporation adopts (Hillman and Keim, 2001). If the scope and extent of corporate social responsibility strays beyond stakeholder management to address social concerns that have little or no relation to a firm's stakeholder relations, then improvements in social performance become associated with declining financial performance. This perspective is also congruent with a principal-agent concept of the CSP-CFP relationship. Generally, owners are assumed to be risk neutral with respect to a particular investment because they are able to diversify their overall risk by owning shares in a large portfolio of firms,



whereas managers are assumed to be risk averse because their income and job security depend on the performance of a particular firm (Williamson, 1964). Managers may overinvest in projects that lower a firm's financial costs due to differences in risk aversion between principals and agents. Risks are taken at the expense of the greater, but riskier, degree of financial performance that owners seek (Williamson, 1964).

According to model (iv), high financial success has been linked to either extremely high or extremely low levels of social responsibility. This interpretation of the CSP-CFP link is compatible with Porter's competitive advantage approaches, which suggest that organizations that follow low-cost or differentiation strategies are more likely to beat those who are "trapped in the middle". Firms that invest moderately in social performance do not save resources for other investments or differentiate themselves in the perception of stakeholders, and as a result, they experience poor financial performance.

Aside from disagreements on the structure of the relationship between social and financial performance, there is also disagreement over the time horizon over which such interconnections could emerge. This is dependent on when the costs and rewards of excellent social performance occur. Simultaneously, the extent of the potential advantages to social performance varies among categories of social performance and across time. However, many of the advantages of being socially responsible are conditional on stakeholder groups' awareness of firm activity (Bhattacharya and Sen, 2004). As a result, in order to enhance the benefits of being socially responsive, a company must be consistently socially responsive throughout time. In conclusion, net financial gains accrue only over time when the expenses of such projects are amortized, and stakeholders are sufficiently informed of the firm's social performance to affect their decision-making in ways that benefit firms. On the contrary, according to Ruf et al. (2001), the stakeholder theory does not answer whether there is a time gap between CSP investment and financial returns. The current study's findings imply that improvements in CSP have both immediate and long-term financial consequences.

### **1.2.3 Effect of CSR Controversies on Reputation and CFP**

While it seems logical for companies to implement actions related to protecting the environment and communities, they do not always invest a sufficient amount of their budget in CSR initiatives. In this case, the actions and choices of managers that are not aligned with sustainability principles can result in litigation and have a negative impact on their reputation

(Janney and Gove, 2011). In addition, scandals and controversies can undermine a company's reputation and thus negatively impact the company's performance (Walsh et al., 2009). For example, the Boeing scandal with the Boeing 737 Max led to the company losing value in the stock market and damaged its reputation. A company's reputation is a key element in improving its performance (Aguilera et al., 2007). In this context, Kim et al. (2015) suggested that a company's sustainable practices enhance its reputation and performance through its commitment to the well-being of future generations. According to the literature, litigation arises when a company is involved in actions or incidents that may have a negative impact on its stakeholders and on the environment (Li et al., 2019). The study by Li et al. (2019) suggests that companies use symbolic ESG strategies after an event to mitigate the short-term negative impact. However, it is still known little about whether or how much controversy affects financial performance.

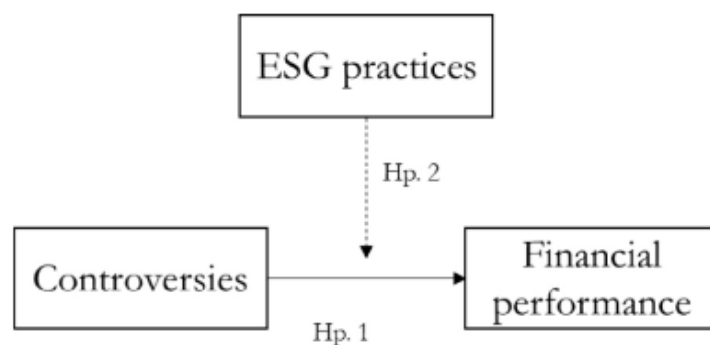


Figure 3: Hypotesis and Model (Nirino, Santoro, Miglietta, Quaglia, 2021)

The study by Nirino, Santoro, Miglietta, Quaglia (2021) from which Figure 3 was taken, argues that financial performance is negatively correlated with corporate scandal. ESG factors have not been shown to have strong influences on the relationship between the two as they fail to mitigate the negative impact of controversies on performance. Despite these considerations, the researchers argue that these factors are essential to meet the needs of stakeholders and improve the reputation of the company. Whereas in the past the sole objective of the company was to create value for the shareholders, stakeholder theory has revolutionized this perspective by shifting the company's objective towards the interests and needs of the stakeholders. (Freeman, 1999). The resource-based view is not alone in arguing that a company's commitment to sustainable activities towards society and the environment helps to develop a competitive advantage. The company not only improves its reputation (Kim et al., 2015) but also develops unique skills and competences that are difficult to reproduce. A relevant aspect

of CSR concerns disputes and controversies, these arise when the company is involved in situations and commits actions that may negatively impact on its stakeholders and on the environment (Li et al., 2019). Consequently, corporate reputation suffers and therefore companies implement CSR practices aimed at restoring lost credibility. Following the literature, reputation is an important aspect to consider in order to improve financial performance (Aguilera et al., 2007; Li et al., 2019). A positive reputation can lead to long-term benefits and help create value and trust among stakeholders. (Roberts and Dowling, 2002). On the contrary, a negative reputation can lead to bad implications such as lawsuits, revenue losses, increased financial risk, and an increase in the cost of debt (Lange and Washburn, 2012). Stakeholder response to a multiplicity of disputes by a company has reason to generate a decline in financial performance. Especially for listed companies, disputes may have a greater resonance due to possible market overreaction and stakeholders could take actions against the company by breaking off relations and shareholders could sell their stocks. Many researchers argue that investing in ESG practices has a positive impact on financial performance. (Bird et al., 2007; Margolis et al., 2009). This result is possible by exploiting the competitive advantage gained by implementing these investments and the trust that is built up between the company and its stakeholders in the long term (Birindelli et al., 2013). Two types of sustainable practices are identified to respond to stakeholder pressure: symbolic or substantive. The first are made to show stakeholders a positive image of the company; these symbolic practices are only effective in the short term as they do not require investment of large resources and can lead to a loss of credibility if repeated over time (Kim et al., 2015). On the contrary, substantive practices imply costs that may not show great results in the short term but can have a great impact on performance in the long run (Wang and Sarkis, 2017). Despite several studies demonstrate the benefits of adopting sustainable practices, companies frequently have an improper behavior. When it turns out that a company is involved in controversies, the company begins to develop programs related to the protection of the environment, local communities, and human rights (Livesey and Kearins, 2002). These programs can be defined as “reacting social changes” in response to negative actions in order to mitigate their effects. However, also “proactive social change” could be implemented. According to this, companies implement actions to develop ethical and sustainability principles without being previously involved in controversies or scandals (Hart & Milstein, 2003). As a consequence, when a company is more engaged in environmental and social practices, stakeholders and communities are more likely to trust the company, reacting in a less negative way to any negative events. However, if these practices are only symbolic, they can't mitigate the loss of confidence from

stakeholders. As suggested by Klein & Dawar (2004), if a company has implemented sustainability practices in the past, they are able to decrease the risk of losing reputation after a negative event. In particular, real sustainable actions can enhance a firm's reputation among stakeholders and lead to better financial performance (Park et al., 2014). As such, it is reasonable to assume that sustainable actions pursued by firms allow them to alleviate the negative effects of controversies and a negative reputation.

### **1.3 The History of ESG Ratings**

Many researchers categorize different CSR activities into three main pillars called ESG factors: environmental, social and corporate governance. ESG factors are also considered as financial performance indicators. According to the Financial Times, “ESG is a term commonly used by investors to assess corporate activities related to environmental, social and governance areas”. As a result of the developments explained in the previous paragraphs, there has been an increase in demand for CSR ratings (so called Sustainability Ratings).

Sustainability has been one of the most significant trends in financial markets for decades, both on the side of investors, seeking a sustainable and responsible investment, and on the side of company management. This trend derives from the growth of the Global Reporting Initiative (GRI), the Global Compact of United Nations and the Principles for Responsible Investment (UN PRI). The GRI provides organizations with a common sustainability reporting language (GRI standards) for communicating their impacts; it is an independent and international company. The United Nations Global Compact encourages and helps businesses all over the world to develop an economic, social, and environmental framework useful for a global sustainable growth. It demands businesses and organizations to share, support, and implement a set of basic principles including human rights, labor standards, environmental preservation, and anti-corruption. Furthermore, in 2006, the United Nations created the Principles for Responsible Investment (PRI) with the goal of encouraging institutional investors to embrace sustainable and responsible investment practices.

As a result of these indicators, the number of organizations that provide CSR ratings to investors and consumers has expanded, and CSR ratings have become the primary means of communicating ESG corporate performance (Màrquez & Fombrun, 2005).

Although the goal of rating agencies appears to be clear, there are a few drawbacks to consider. Due to a variety and plethora of participants and methodologies to analyze ESG corporate performance, the rating's marketplace behavior is perplexing. Which criteria are used throughout the review process is still unclear (Màrquez & Fombrun, 2005). To summarize, ESG rating organizations wield enormous influence over a company's reputation, thus they must produce accurate and dependable data.

Thomson Reuters Datastream and Bloomberg are two main providers of ESG indicators that build their analysis with distinct modalities that lead to slightly different results. The first database is based on the actual availability of data while the second is based on a reconstruction of the clues available at the corporate level.

According to Thomson Reuters - Refinitiv Report 2021, more of 500 ESG measurements are taken into consideration for each company, then, in order to produce comparable scores, they are reduced to 186. These data are grouped into ten categories constructed to arrive at an overall score that is broken down into three macro-sector scores: *Environmental, Social, Governance*; further divided into sub-sectors that analyze specific elements.

Three subgroups divide the environment category, the first covering resource use and the company's ability to reduce material use and find more sustainable supply-chain solutions. The second looks at the company's commitment to reducing emissions. The third focuses on innovation and the company's ability to reduce costs and create new prospects in the marketplace using sustainable technologies.

The social category focuses on issues of workforce, human rights, community and product responsibility. These factors are intended to measure the company's commitment to creating a safe and healthy working environment, high levels of employee satisfaction, creating new opportunities, ensuring gender equality and complying with business ethics.

Finally, the corporate governance category examines the management, shareholders and the CSR strategies implemented by the company. More specifically, the ability to integrate CSR dimensions into day-to-day management and fair treatment of shareholders. The Figure 4 explains the classification of the three ESG macro-factors.

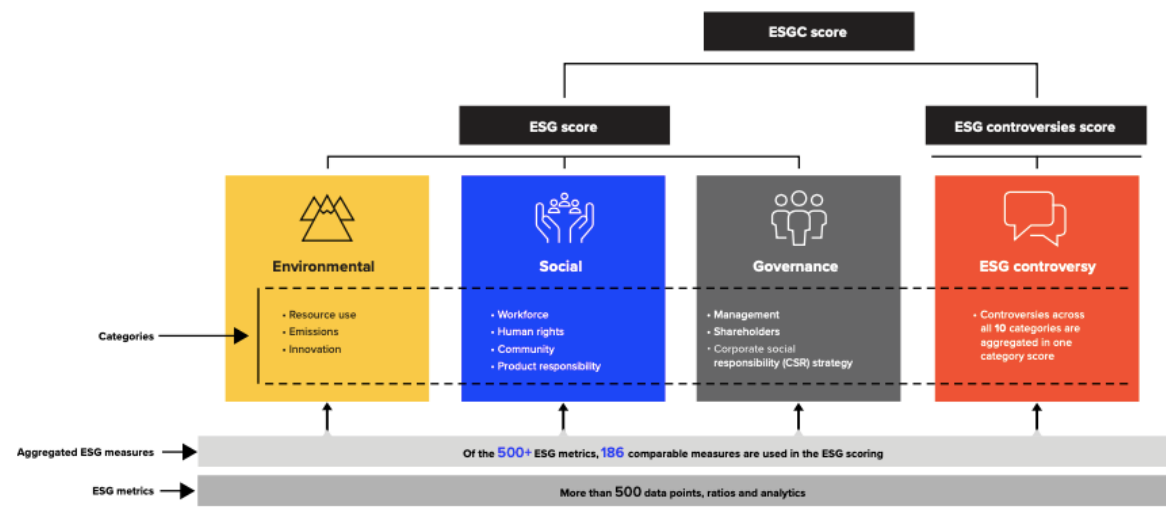


Figure 4: ESG macro-factors classification (Refinitiv, 2021)

The ESG controversies score is produced based on 23 ESG controversial subjects. If a scandal arises during the year, the firm concerned is penalized, and this has an impact on their total ESGC score and grading. The influence of an event may be also observed in the following year, and as the situation unfolds, all fresh media items are recorded. The controversies score also considers the market size bias that large-cap corporations face since they receive more media attention than smaller-cap companies. As the Figure 5 shows, their ESG Ratings range from leader (A+, A, A-), average (B+, B, B-, C+, C, C-) to laggard (D+, D, D-) according to which level of percentile score the companies got.

Score range	Grade	Description
0.0 <= score <= 0.083333	D -	'D' score indicates poor relative ESG performance and insufficient degree of transparency in reporting material ESG data publicly.
0.083333 < score <= 0.166666	D	
0.166666 < score <= 0.250000	D +	
0.250000 < score <= 0.333333	C -	'C' score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.
0.333333 < score <= 0.416666	C	
0.416666 < score <= 0.500000	C +	
0.500000 < score <= 0.583333	B -	'B' score indicates good relative ESG performance and above-average degree of transparency in reporting material ESG data publicly.
0.583333 < score <= 0.666666	B	
0.666666 < score <= 0.750000	B +	
0.750000 < score <= 0.833333	A -	'A' score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.
0.833333 < score <= 0.916666	A	
0.916666 < score <= 1	A +	

ESG laggards

ESG leaders

Figure 5: Conversion from a ESG percentile score to a letter grade (Refinitiv, 2021)

Despite the problems relating to the availability of data, its screening and the different types of databases, the ESG factors make the companies comparable and attribute a score to actual risk factors which necessarily have an impact on the cost of capital.

According to a 2018 MSCI study, firms that effectively manage industry specific ESG risk outperform those that do not. Indeed, the study's findings revealed that organizations with strong returns, high margins, and financial efficiency had the highest ESG ratings, and that environmental and social pillars make a significant impact.

Broadly speaking, research that has examined the impact of ESG scores has found that companies with better scores benefit due to a lower cost of debt and equity. The literature has highlighted how a good corporate governance reduces the cost of debt, while environmental mitigation practices, transparency in environmental policies (El Ghouli, Guedhami, Kim and Paek, 2014), good labor relations and product safety (El Ghouli, Guedhami, Kwok and Mishara, 2011) reduce the cost margin of risk capital. Improved CSR can enhance firm value by reducing the firm's cost of equity capital. A salient aspect of a company's financial performance relates to the risk exposure an investor would have if they decided to undertake an investment based on an ESG score and how the financial riskiness of a listed company may be affected by any upgrades or downgrades.

## CHAPTER 2. Airline Industry Overview

### 2.1 General Characteristics

Transportation and mobility are two driving forces of the social progress. The mission of the company that run their business in this field is to find a balance between six KPIs of the sector. The modern society require to air transportation companies to offer a *wide range* of services to connect people and locations globally, a *reliable* service with a high level of transparency and a *safe travel*, especially for what concern external risks such as terrorism, health issues and security of the planes. Recently, both the demands for *fast-speed transport* and *smaller environmental impact* are increasing because of improved technological innovations and global trends and needs. Lastly, the *cost-efficient* model is growing in popularity especially with the emergence of Low-Cost Carriers (LCC) and the implementation of new yield management techniques.

The global air transport market is estimated to increase at a compound annual growth rate (CAGR) of 11.6% from \$653.05 billion in 2021 to \$728.61 billion in 2022. Moreover, it is expected to reach \$1,332.45 billion in 2026 at a CAGR of 16.3%. The market is segmented by type of services, by distance and by end-use. There are three main types of air transport services: passenger air transport, private and public chartered air transport, and air cargo services. These services could cover long-distances or short-distances and the end-use could be private or commercial.

Among all types of transport, according to a McKinsey study, air transport ranks first in terms of revenue in the travel sector and last in logistics with Air Cargo, this result highlights the high importance of the passenger air transport field.



	Sub-sector	Revenue (€bn)	CAGR (since 2014)
<b>Travel</b>	Air travel	116	4.3%
	Accommodation	95	3.8%
	Holiday package	55	3.3%
	Passenger rail	33	3.3%
	Cruises	19	2.8%
	Car rental	12	5.8%
<b>Logistics</b>	Trucking	320	2.0%
	Freight forwarding	42	3.0%
	Ocean cargo	22	3.0%
	Rail cargo	20	1.0%
	Air cargo	3	3.0%

Figure 6: Revenues of the travel sector (McKinsey & Ringbeck, 2021)

The world annual traffic is predicted to continue to develop strongly, although at a somewhat lower CAGR than expected as showed in Figure 7.



Figure 7: World annual traffic (Airbus, Global Market Forecast)

Historically, the market environment has not been a competitive one: most of the airlines in the world except those of the United States were state-owned and considered as "flag carriers" and valued national assets by governments. The 1944 Chicago Convention, which continues to set the ground rules for international civil aviation, established a global network of bilateral air services agreements, under which countries granted each other the right to conduct air transport services between their respective boundaries. The transition from traditional bilateral air

services agreements to Open Skies agreements happened in the US in 1978 with the Airline Deregulation Act that establish the deregulation of the domestic market. The following year, 1979, the International Air Transportation Competition Act promoted the liberalized bilateral air services agreements with other countries. In contrast to US deregulation, which occurred all at once, EU liberalization was a systematic five-year process that took place from 1987 to 1992. Open Skies policies and the adoption of a market-oriented approach to the operation of international air services, have been in place since 1992. There are currently over 150 Open Skies accords in place, the most well-known of which being the EU-US Air Transport Agreement, which was signed in 2007 and revised in 2009 (OECD, 2014, Colangelo 2020). After the liberalization, the airlines picture in the EU has drastically transformed, with the emergence, and indeed predominance, of low-cost carriers (LCCs), significant changes in business models and pricing practices by traditional "legacy" airlines, a large increase in the number of routes operated and points connected, and strong downward pressure on fares. Furthermore, state control of major airlines in each member state has almost disappeared.

<b>Features</b>	<b>FSCs</b>	<b>LCCs</b>
<b>Core business</b>	Passenger and Cargo	Passenger
<b>Consumer base</b>	All – economy and business	Economy
<b>Network</b>	Hub-and-spoke often at main airports	Point-to-point often between secondary airports
<b>Coverage</b>	Domestic, international and intercontinental	Domestic and continental
<b>Ticketing</b>	Round-trip ticket	One-way ticket
<b>Ticket selling</b>	Various distribution channels (e.g. agency, direct)	Direct on-line
<b>Aircraft</b>	Cabin divided into economy and premium (first/business) class	Single class cabin
<b>Fleet</b>	Diversified	Uniform
<b>Product bundling/ differentiation</b>	Frills (i.e. complimentary services)	No frills
<b>Customer management</b>	FFP	No FFP

Figure 8: Comparison of FSC\* and LCC business models (Colangelo, 2020)

\*Full Service Carriers

Airlines are constantly adapting their business strategies in response to increased competition and changing consumer demand. The hybridization of airline business models reflects this

growth, with a continuum of multiple business models in play rather than a simple classification by separate groupings.

Another consequence of market liberalization was the opportunity for cooperation and consolidation between airlines. This recent trend is developing in the industry through alliances, horizontal cooperation agreements that differ from a merger, and which may vary widely in scope and strength. Alliances allow airlines to extend and diversify their network, grow and rationalize their costs without increasing their own aircraft capacity or route offering: alliances are viewed as the second-best choice after mergers for achieving economies of scale, scope, and density.

The air transport market is also subject to both strategic and structural barriers. The former concern competition issues and emerged post liberalization. Indeed, airlines have developed strategies to reduce the propensity of consumers to switch from one airline to another, through reward and loyalty schemes. While structural barriers are related to the accessibility of slots. In fact, companies do not own the slots, these are allocated on historical bases with rights created by the government. Since there is no market for slots, the rule is “use it or lose it”. Slots are used as property rights and in the balance sheet as assets that belongs to different companies. The slot represents the key element to enter the market, the essential condition to the functioning and development of traffic. What it is important is the secondary market that allows to exchange/sell slots creating a market in a secondary stage.

### **2.1.1 The Air Passenger Transport**

Air passenger transport is a very young sector, it started about one hundred years ago, since the beginning technical safety was one of the major insights of the sector. Flight safety has improved massively in the last decades, especially after the deregulation phase. Some improvements have been made about energy efficiency; however, CO<sub>2</sub>-footprint remains a relevant problem. Future growth is expected to be driven from emerging markets such as Asia and tourism. This market has a strong dependency on macro trends such as globalization, sustainability, terrorism, and pandemics. An example of this influence is given by how demand for mobility of people and goods is expected to grow faster than world GDP. The main drivers in this case are population growth, GDP and wealth of individuals (Figure 9).

However, air passenger traffic is recovering slowly after Covid-19, and it is still behind the global economy (Figure 10). The industry-wide revenue passenger kilometers (RPKs) remained down a significant 64.5% between January 2021 and July 2021 versus the same period in 2019.

**Long-Term Development of Global Mobility**  
Forecast 2000-2035, Index 2000 = 100%

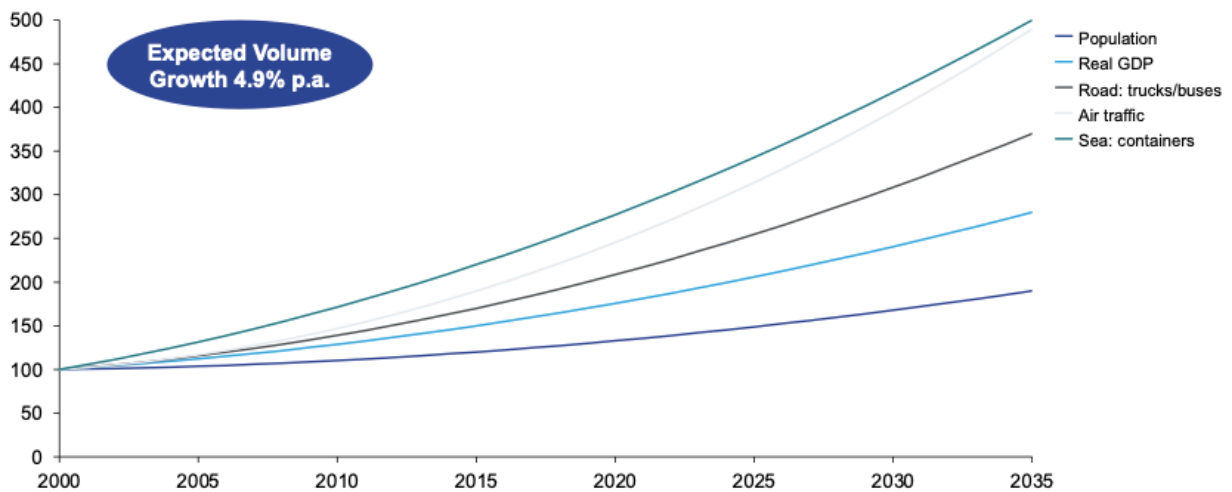
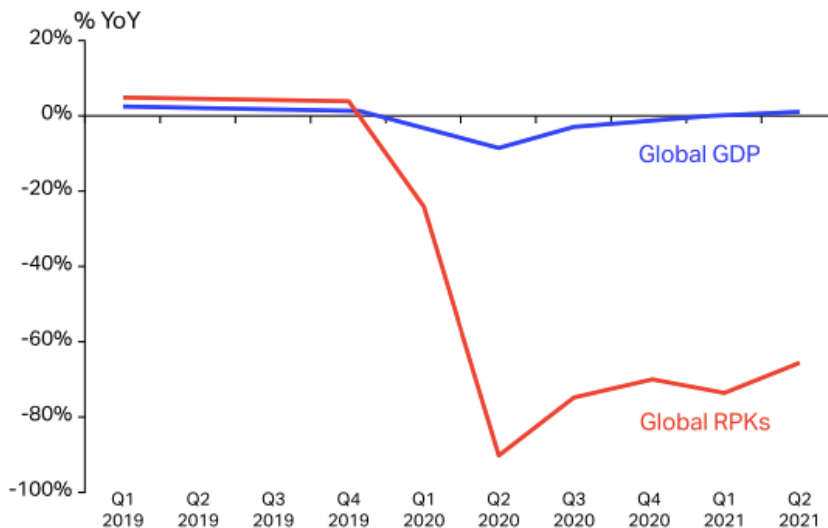


Figure 9: Long-term Development of Global Mobility (Ringbeck, 2021)



Source: IATA Economics, using data from IATA Monthly Statistics and Refinitiv Eikon

Figure 10: Passenger traffic (IATA, 2021)

## 2.2 The Role of Sustainability

International air transport has unquestionably been one of the most powerful and vital drivers of globalization, linking people and companies from all over the world and fostering tourism, cultural exchange, trade, and much more. While the economic and social advantages of global air transportation are evident, the aviation industry's environmental costs and externalities are enormous (Schipper, Rietveld & Nijkamp, 2001; Upham, Maughan, Raper & Thomas, 2012). The CO<sub>2</sub> footprint of air traffic is larger than that of public road transport but smaller than that of cars with only one passenger. However, despite this evidence, air traffic has secondary effects due to high altitude that increases its impact on global warming.

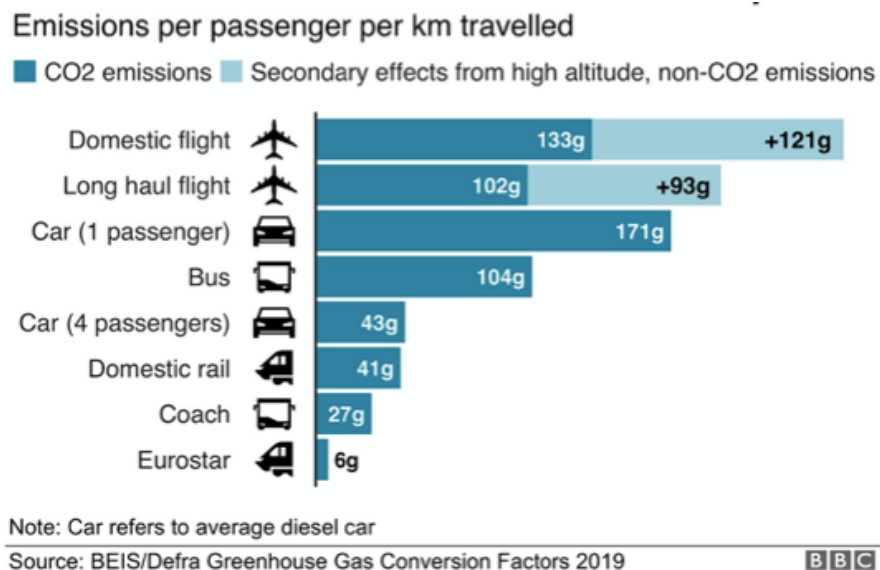


Figure 11: Emission from different modes of Transport (BBC)

Although data show that energy efficiency has improved, the world is growing exponentially. More and more people have higher income which transforms in higher share of travel spend, consequently there are more CO<sub>2</sub> emissions.

Public concern is increasingly sensitive to the issues of climate change and global warming, which is why the aviation sector is also suffering from external pressure towards a carbon neutral future even though it is responsible for only 3.5% of anthropogenic climate forcing (Lee et al., 2021). The European Union through the Green Deal has also set itself the goal of

achieving climate neutrality by 2050, not only revising the key pillars of the climate policy but also creating a new legislative proposal such as "ReFuelEU" that supports the development of sustainable alternative transport fuels (European Commission, 2019).

Although the aviation industry's commitment to sustainability and external pressure about it, the overall carbon emissions in the period among 2014 and 2019 have increased by almost 46%. The major reason for this rise is due to the tremendous increase in global aviation travel in recent decades (IATA, 2020a; Mazareanu, 2020). The worldwide airline sector registered more than 4.5 billion scheduled passengers, an increase of around 127.8 percent (Mazareanu, 2021; IATA, 2021a). Additionally, the International Air Transport Association (IATA) anticipates a 3.7% average annual rise in worldwide air passenger travels over the next 20 years, based on the most recent predictions (IATA, 2020b).

The International Air Transport Association (IATA, 2009) and the International Civil Aviation Organization (ICAO, 2010) have agreed on the need to take effective measures to reduce emissions and mitigate the negative effects of aviation, outlining a series of environmental targets. However, the measures taken such as the ICAO Basket of Measures are still a long way from achieving the goals set for both limiting CO<sub>2</sub> emissions and following the United Nations Framework Convention on Climate Change (UNFCCC) agreements. The ICAO Basket of Measures includes aircraft technology and standards, air traffic management and operations, sustainable aviation fuels, and market-based measures (CORSIA) to mitigate Climate Change. Carbon Offsetting and Reduction Scheme for International Aviation - CORSIA aims to achieve carbon neutral growth from 2020 onwards through carbon offsetting.

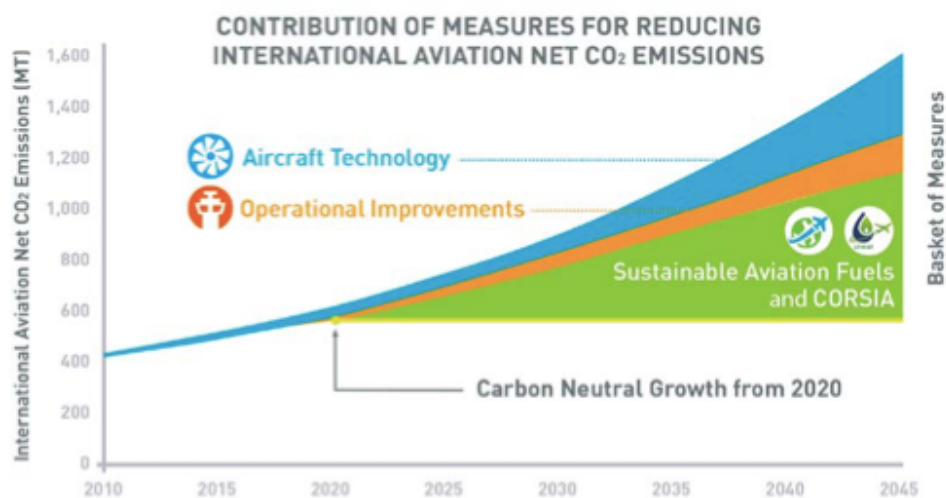


Figure 12: Contribution of measures for reducing international aviation net CO<sub>2</sub> emissions (ICAO, 2019)

Despite the commitment shown, the widespread view is that it is not enough to achieve the goals of the Paris Agreement to avoid a temperature rise of plus 1.5 degrees Celsius (Baledón and Kosoy, 2018). However, the CORSIA plan has come under criticism since, for instance, the ICAO, a specialized body of the United Nations, lacks the legal ability to implement the various airline offsetting obligations. (Becken & Mackey, 2017).

The recent Covid-19 pandemic has not only negatively impacted the health of the entire world population but has also brought consequences in many sectors. Furthermore, international restrictions and lockdowns have led to a sharp decrease in demand in air transportation and consequently lowered airline revenues (Figure 13).

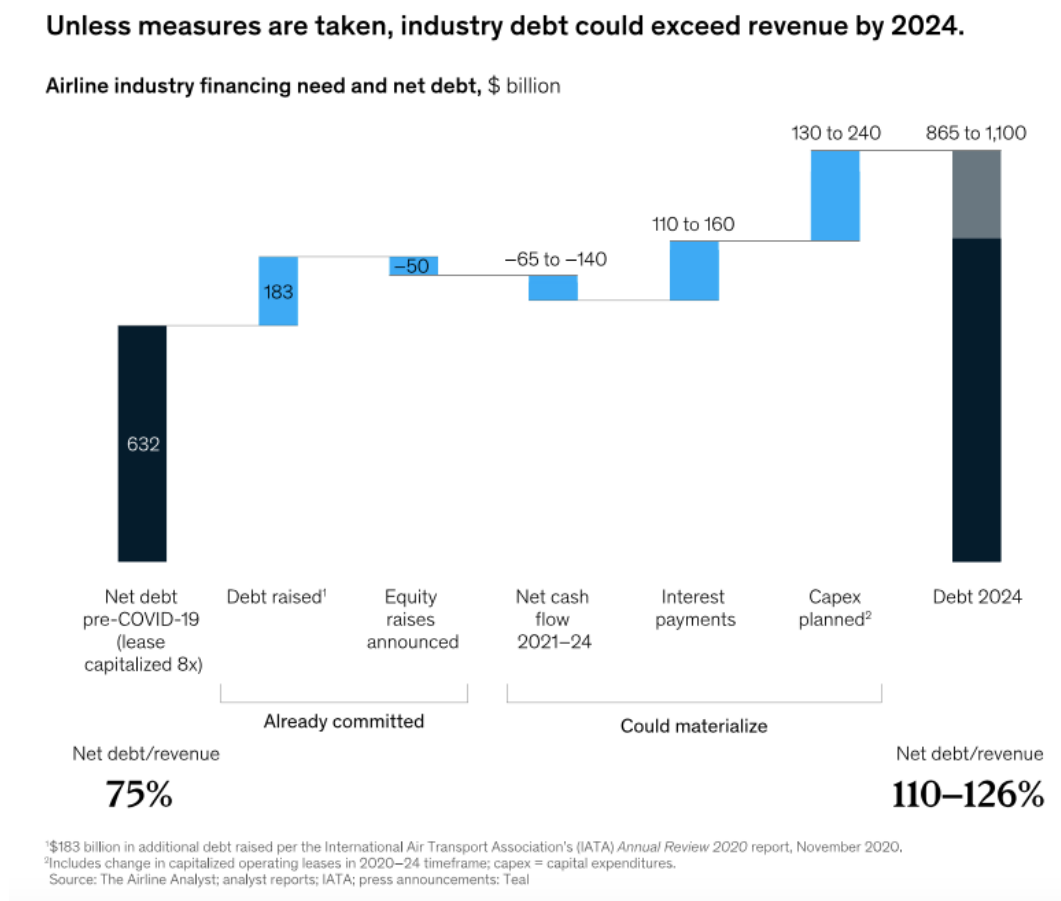


Figure 13: Airline industry financing need and net debt (McKinsey)

In terms of revenue passenger kilometers (RPK), worldwide air passenger traffic of 2020 declined by about 66 percent from levels in 2019 (Figure 14); according to IATA (2020) this was the greatest traffic drop ever observed. As a consequence, airlines reported a cumulative

financial loss of \$118.5 billion with the industry recording just 16.4 million flights overall in 2020 compared to 38.9 million flights in 2019. Due to drastic pause in operations, available assets and cash reserves were swiftly drained; thus, the ensuing liquidity gap was mostly filled by state aid and government help. By 2024, the global aviation industry's net debt is projected to have risen by 38 to 74% in comparison to 2019. The COVID-19 epidemic might logically be seen as complicating the global aviation industry's attempts to decarbonize because survival and a rapid industry recovery are now aviation management' main priorities.

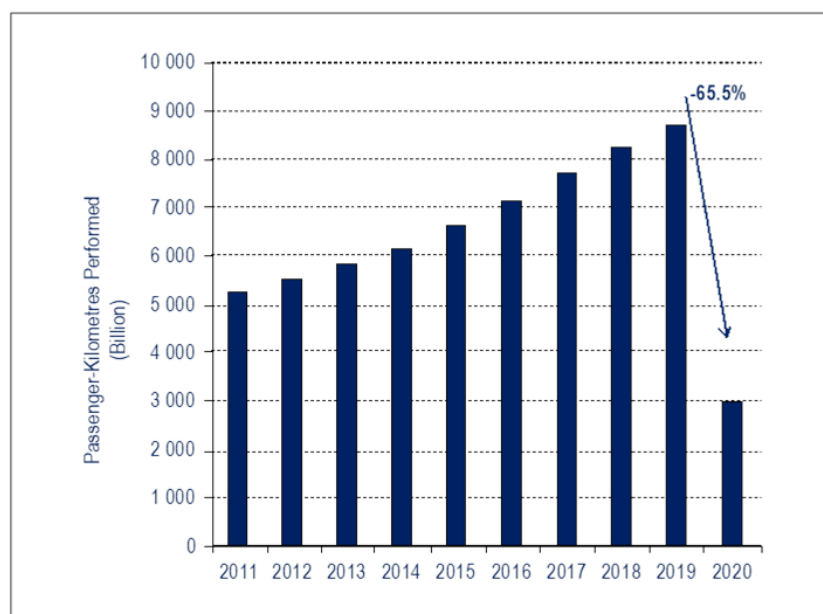


Figure 14: Passenger-Kilometres Performed Total Scheduled Traffic, 2011-2020 (ICAO, 2020)

However, according to the Global Market forecast published by Airbus world air traffic will be recovered at 2019 level in 2023 as showed in Figure 15.



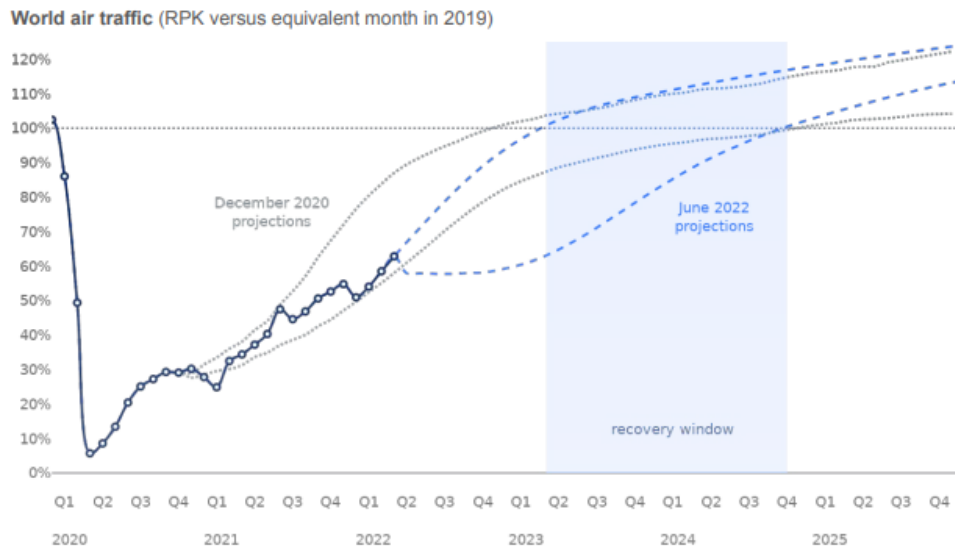


Figure 15: World Air Traffic (Airbus, Global market forecast)

### 2.2.1 How to Be More Sustainable?

One possibility for airlines to be more energy efficient is to provide fleet renewal processes. This renewal action already planned by many companies has been slowed down by the financial instability that COVID -19 has brought. Another solution that can lead to visible results in the short-term regarding decarbonization is definitely SAFs. According to IATA, “Sustainable aviation fuel (SAF) is the main term used by the aviation industry to describe a nonconventional (fossil derived) aviation fuel.” Chemically and physically SAFs are very similar to commonly used fuels, in fact they can also be mixed in different proportions with them. The most popular SAFs, however, are biofuels, produced from biological resources of both animal and plant origin. These alternative fuels could be obtained from a very common and abundant thing: rubbish. One of the major benefits they would bring is the ability to cut CO2 emissions by 80%. Since SAF, as we said before, is similar to traditional fuels in term of composition, it does not reduce emissions due to a reduced percentage of anhydride in the exhaust gas. Instead, it avoids emissions from the final treatment of rubbish that landfills, and incinerators would otherwise generate. The problem with SAFs is that there are not enough incentives to produce and consequently buy them. High production costs and volatile oil prices do not provide security for investors and producers.

Shifting the perspective to long-term choices (around 20/30 years), two alternatives could be the use of green hydrogen as a fuel and the introduction of electric aircraft. However, these

innovations require large R&D investments and national and international programs to support the transition. On July 2021, the European Commission adopted sustainable legislative proposals in order to achieve climate neutrality in the EU by 2050 in which hydrogen plays an important role.

It is also important to consider the point of view of the end consumers and not just the production part. Carbon neutrality is not viewed as a quality characteristic by all the customers, whom are also unwilling to pay for it. As more and more people choose shorter destinations using other types of transportation, it is still uncertain if consumers will absorb higher ticket costs in the future or whether airlines would need to dramatically cut their flight capabilities due to “sustainability” costs. This poses the fundamental question of how important global mobility is for society and what are the consequences of the carbon-neutral extra cost on wellbeing especially on tourism countries or among lower-income population groups. Furthermore, large states and realities such as the European Union are the pioneers of this innovation and also play a key role for smaller states that take them as models. Therefore the decarbonization process pursued by the institutions must not only aim at the environmental objective but also at creating a future competitive market in order to achieve a global result. The goal of the airlines should be to secure long-term commercial advantages in a climate-neutral flight business with new aviation technologies investments and thus ensure sustainable competitiveness.

### **2.3 ESG Factors in the Airline Industry**

At the moment, corporate social responsibility (CSR) is the source of competitive advantages in the aviation business, which operates in a competitive environment. The performance of environmental, social, and governance (ESG) factors has grown to be a crucial sustainable development approach impacting businesses' total performance (Eccles et al., 2014). CSR initiatives are being looked into by several airlines; there is significant concern regarding the effects of CSR adoption on business financial performance, particularly for airlines with high capital intensity and large external debt. In light of this, full-service carriers (FSCs) primarily do environmental CSR operations (Cowper-Smith and de Grosbois, 2011).

The structure of operations typically results in poor CSR performance for the transportation sector, although larger enterprises are more likely to engage in CSR-related activities due to their higher financial performance. In terms of corporate social responsibility (CSR), low-cost

carriers (LCCs) are typically seen as having the lowest environmental sensitivity. However, the transportation sector is frequently noted to have below-average participation in CSR activities (Hagmann et al., 2015). In terms of sustainability and environmental effect, it is recognized as one of the most difficult industries. This is because there are questions about whether financial and environmental sustainability can coexist. The direct conflict between sustainability and economics policies is best shown by the air transportation industry, which also serves as a useful starting point for research into how airlines may balance societal efforts in their corporate strategy. For airlines, achieving financial sustainability is possible, but achieving environmental sustainability raises financial concerns for the company as well as the sector as a whole. According to Forsyth (2011): *“Good policies achieve environmental sustainability at minimum cost in terms of other objectives or equivalently achieve the maximum environmental benefits consistent with an acceptable level of economic and financial performance”*.

An essential management tool to integrate ESG strategy into the business will be a complete carbon management system that will track and optimize airline decarbonization in all company operations (such as ground operations and supply chains).

### **2.3.1 Environmental Issues**

The most common ESG strategies adopted by airlines concern environmental issues. In fact, the common goal is to decrease the amount of CO<sub>2</sub> emissions. There are also many other activities that concern the environment such as local noise pollution caused by aircraft. These kinds of problems, however, are secondary, because at the center of criticism and as we said in the paragraph 2.2, there are CO<sub>2</sub> emissions and their impact on climate change.

### **2.3.2 Social Dimensions**

Airline companies implement social practices both internally and externally. Internally the focus is on the employees' all-round wellbeing, while externally the initiatives concern humanitarian and charity projects. Internal policies, on the other hand, focus on ensuring a fair work-life balance, ensuring quality and safety in the working environment and, finally, ensuring free health services. An important social practice in the airline industry is to ensure training and educational opportunities for employees to help them progress in their careers and ensure proper service. As recent trends show us, an eye must be kept on the concept of diversity.

in October 2019, IATA launched an initiative “25by2025” to increase gender balance throughout the industry.

## IATA Economics' Chart of the Week

### Women are still under-represented in leading positions at airlines

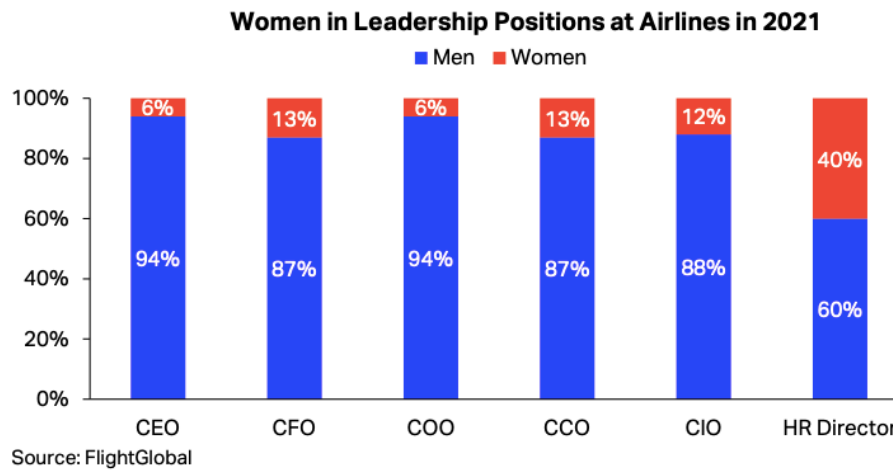


Figure 16: Percentage of women in leading position at airlines (IATA, 2022)

### **2.3.3 Corporate Governance Practices**

When evaluating ESG practices it is vital to take the variable of ownership into account, especially for airline companies. Private ownership, public ownership, or mixed ownership are three types of ownership, and the control power increases with the percentage of ownership. According to a research by Kao et al. (2018), private airlines do the best financially in the short term, followed by state-owned airlines and mixed-ownership airlines. Usually mixed-ownership airlines perform the worst on CSR practices, and this is due to issues with leadership and culture that may not be strong enough. Moreover, in this type of ownership significant conflicts of interest could emerge between management and stockholders. All these elements affect the short-term financial performance of the company in a negative way. This study cited above has shown how the type of ownership considerably modifies the influence of ESG performance indicators on ROA.

Another important practice related to corporate governance that airline companies put effort on is the composition of the board of directors. This factor is crucial to enhance the long-term value of the company and protect the shareholders' interest. Most of the policies focus on diversity and inclusion especially for what it concerns gender diversity.

### **2.3.4 Relationship Between CFP And ESG in the Airline Sector**

Although common sense principles are used to create sustainability requirements in frameworks, full-service and low-cost airlines may have differing outcomes. Many studies on correlating ESG-CFP have also focused on the kind of airline business. More in particular, it has been discovered that usually full-service carriers are more environmentally friendly than their low-cost competitors (Hagmann et al., 2015). This is due probably to the failure of low-cost airlines to balance operational savings with non-operational investments in sustainability programs. Full-service airlines, on the other hand, are distinguished by high stakeholder expectations in terms of sustainability initiatives. (Seo et al., 2015).

Analyzing the empirical result on a study from Yang and Baasandorj (2017) on this topic, it emerges that FSCs have a significant positive impact on ROA through CSR activities. In contrast, LCCs indicate greater significant positive influence toward ROA via firm size than from CSR-related activities. Thus, it seems that FSCs generally outperform LCCs in participating on CSR-related activities. Another study on this relationship applied to the airline industry showed that ESG initiatives affect firm's market-to-book ratio and corporate financial performance in opposite directions (Abdi & Càmara-Turull, 2021). This research demonstrated how social and environmental operations improvements would lead to a decline in firm's market-to-book ratio but increase in Tobin's q (representation of CFP). Also in this case, they found a moderating and significant role of firm size in the relationship.

A study from Kuo et al. (2021) demonstrated that using ESG performance as a measure and indicator of CSR could effectively determine the KPIs affecting short-term corporate performance and focusing on ownership it suggested to provide managers with references for long-term strategic planning for the implementation and improvement of CSR to exhibit a success in the financial performance.

Lastly, a very interesting study from Abdi & Càmara-Turull (2020) showed how an increase in environmental and governance pillar disclosures leads to a higher market-to-book ratio and financial performance of airlines. As a consequence, an airline company should invest in CSR practices, such as reusable resources, innovation, reducing emissions, better management structure, and implementation of a sustainability policy in order to be more attractive for the investors and create a competitive advantage in the market. On the other hand, this study showed that an airline's social activities result in lower market value and level of financial performance, social pillar was found to be negatively associated with both a firm's value and its financial performance. In conclusion, the relationships between ESG and CFP results to be

direct for the environmental and governance practices, but indirect for the social disclosure part.

The outcome of these multiple studies highlights the importance of considering sustainability practices in the industry. Although many similarities, these studies sometimes contradict each other and leave wide margins for new research. The purpose of this work is to expand the literature on the subject; the empirical study will be carried out in the next chapter.

## CHAPTER 3 Empirical Analysis

### 3.1 Research Questions

The analysis of the literature in the previous chapters does not provide a clear and univocal view of the relationship between CSR and financial performance. Although it has been demonstrated that this relationship can exist, the variables involved, and the different results show that the topic is controversial. This work aims to study the possible correlation phenomenon between the two variables; and more specifically to observe whether the adoption of sustainable policies can lead to better financial results for airline companies. A further analysis is done to find out whether a company with high ESG also has high financial performance ratios. This leads to the definition of three research questions:

- 1 *Is there any relationship between Corporate Social Responsibility and Corporate Financial Performance for airline companies?*
  
- 2 *Higher ESG ranking score can lead to better financial performance for airline companies?*
  
- 3 *Is there a difference on average financial performance between airline companies with a high ESG score and those with a low one?*

The uniqueness of this study focuses on using the objective values of ESG rankings to evaluate the social performance of companies and on the type of industry studied. The transportation industry and more specifically the airlines that are part of it, have well-defined peculiarities that are different from any other industry as it is described in the previous chapter. The recent emphasis on sustainability in this area and the controversial literature lay the groundwork for further research.

## **3.2 Methodology**

To give an answer to the three research questions introduced above, it is appropriate to resort to statistical analysis through objective data found on airline companies around the world. Considering that our purpose is to assess the existence of a relationship between two factors and if it exists with what correlation, the statistical tool used is the regression model. The regression model is a technique used to analyze a data set consisting of a dependent variable and one or more independent variables and to estimate any correlation that exists between them. The type of regression used in this work is the OLS (Ordinary Least Square) regression method which aims to find a function, represented by a regression curve, which is as close as possible to a set of data.

### **3.2.1 Data Collection and Sampling**

All the data used in the model are retrieved from the Thomson Reuters database, Eikon Datastream. This platform, as mentioned above is one of the biggest providers of ESG rankings that build its analysis on the actual availability of data.

The sample of the study consists of 58 airline companies from all over the world for which financial and social performance data could be found on the database. The list of the companies that form the sample can be seen in the Appendix 1. The decision not to make a geographical selection is linked to the type of sector analyzed, its characteristic is in fact that it has relatively few companies per geographic area (due to large capital requirements to set the business and its competitiveness history) and they are extremely connected to link points of the world.

The study will analyze the fiscal year 2019, the choice could have been more recent years such as 2020 or 2021, but as mentioned above, the occurrence of a global pandemic has affected the industry in all respects. For this reason, financial data would have been "off" and more difficult to analyze by having to consider more external contingencies.



### 3.2.2 Variables Choice

This study seeks to determine if airline companies that earn higher ESG ratings outperform their rivals that receive lower ratings in the same industry financially. It is therefore useful to define the variables that best represent the two quantities to be analyzed. The Multiple Linear regression has three types of variables: dependent variable, independent variables, and control variables.

#### **Dependent variable:**

Taking into consideration the aim of the study, the dependent variable will be the corporate financial performance of the airline companies. The first chapter, summarizing the literature on the subject, reminds us that the measures used to calculate this quantity are returns on asset (ROA), returns on equity (ROE), returns on investments (ROI), returns on sales (ROS) and Growth in sales. The most used ones also from the literature reviewed are ROA and ROE both expressed as a percentage.

The Return on Assets (ROA) variable measures the profitability of a business in relation to its total assets. By comparing a company's net income to the capital it has invested in assets, this ratio shows how well the business is doing. Its formula is:

$$ROA = \frac{\text{Net Income}}{\text{Total Asset}}$$

Return on Equity (ROE) is the ratio between a company's net income and the value of its total shareholders' equity. ROE is recognized as an indicator of a company's profitability and how well it generates profits. The higher the ROE, the more efficient the company is at generating income and growth from its equity financing. The formula is:

$$ROE = \frac{\text{Net Income}}{\text{Shareholders' Equity}}$$

The study will carry out two regressions to see if and which of the two chosen dependent variables is influenced by the independent variables. The data are taken from the companies' 2019 financial summary on Refinitiv. Each financial data is expressed in US dollars.

### **Independent variables:**

Since the starting point of the model is a multiple linear regression, the independent variables will be more than one. More specifically, to measure the corporate social responsibility of a company, ESG rankings available on Refinitiv database will be used. Also the study from Kuo, Chen and Meng of 2021 used “*the disclosure of ESG performance indicators as the standard for CSR disclosure, to measure their impact on short-term financial performance of airline companies*”.

As described in the first chapter, ESG rankings are composed of several types of scores: ESG score, ESG environmental, ESG social, ESG governance, ESG controversies, ESG combined (Figure 4, Chapter 1). This study will take the first four of these scores as independent variables. The ESG score is the main and most used score because it covers and includes all three ESG ranking categories. The ESG environmental, ESG social and ESG governance scores, instead, encompass the individual categories of environment, social and governance respectively.

In addition, ESG combined score is calculated as the weighted average of the ESG scores (positive) and ESG controversies (negative) score per fiscal period. Consequently, if corporations do not engage controversies, the ESG (combined) score is equal to the ESG Score. (Refinitiv, 2020).

ESG score data for each airline in the sample were taken from Refinitiv database setting the following categories. Starting with the industrial market and then selecting transport, it was chosen airlines as the subcategory. Moreover, all regions was entered as a geographical filter. The list of airlines with their respective scores was reduced from 121 to 58 airlines as some data was incomplete or non-available. The figure below shows the proportion of airlines for each ESG scores range on Refinitiv, the information on which the graph is based are self-reported by the company about environmental, social and governance pillars.

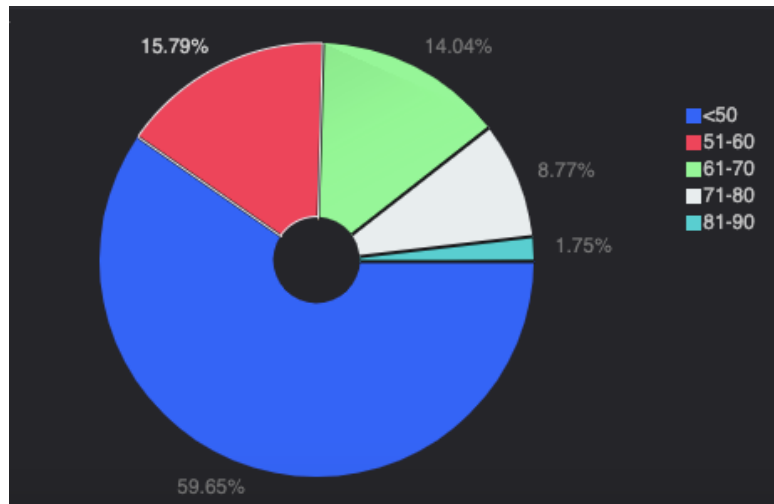


Figure 17: Airlines overall ESG score chart (Refinitiv, 2022)

### Control variables:

ROA and ROE are not only affected by just one factor, but they are affected by many different factors that can influence the result of the regression, which is why we need the control variables. Control variables are held constant or constrained in a research study and despite not being relevant to the study's objectives, these variables are controlled since they could have an impact on the results. Besides improving the internal validity of the study, these variables are fundamental to establish a causal or correlative link between the research variables. It cannot be proved that important factors had no impact on the results if they are not controlled. Following the literature, this study will use as control variables three financial factors: the debt-to-equity ratio, the price earnings ratio and the total assets.

The Debt-to-Equity ratio is also called the “risk ratio”. It is a leverage ratio that represents the relationship between the total debt plus financial liabilities and the total shareholders’ equity. It shows how the capital structure of a firm is oriented toward debt or equity financing. Its formula is:

$$D/E = \frac{\text{Total Debts}}{\text{Shareholders' Equity}}$$

The Price Earnings Ratio is the ratio between a company’s stock price and earnings per share (EPS). Since it represents the expectations of the market, this ratio gives investors a better sense

of the company's value and how profitable the company is and will be in the future. The formula is:

$$P/E = \frac{\text{Stock Price Per Share}}{\text{Earnings Per Share}}$$

The Total Assets refers to the book values of all assets owned by the company. Assets are items that are expended over time to yield a benefit for the owner. For a company, these assets are usually recorded in the balance sheet of the business.

### **3.3 Regression Analysis**

Considering the reflections made on the literature and the definition of the sample and the variables, we now proceed with the statistical models. To answer the first and main question, the research model is composed by two multiple linear regressions. The dependent variable in the first is ROA, whereas the dependent variable in the second is ROE. The regression model is a parametric one which requires a basic hypothesis made on the chosen indicators (in this case profitability and sustainability) represented by the data (ROA/ROE and ESG scores respectively). The regression will be done using the Gretl Software.

Since the sample is low, the problem of Curse or Dimensionality could arise, according to which one must be careful about the ratio between the number of variables used in the regression and the number of observations available. In this case the sample is small, and the independent and control variables are a total of 6 variables (3 ESG variables + 3 control variables) for a total of 58 observations. For this reason, the aim is to have fewer variables for a leaner model. To decide which to eliminate from the study, there is a further problem to be assessed, namely that of correlation. The correlation between the independent variables, in fact, generates collinearity between the variables which could affect the regression result. Therefore, the standard errors of the regression coefficients of the correlated variables would become larger; that is, the estimates become less precise. Moreover, the coefficients are unstable and may change (even in sign) following slight changes in the model structure.

From the correlation matrix (Figure 18), it can be seen that the control variables are not too closely related to each other and can therefore be kept without having much effect on the model.

In fact, analyzing the correlation matrix the correlation values between them are all very low, almost close to 0.

Between the independent variables, on the other hand, the problem of collinearity arises and thus the estimation of the coefficient will then be wrong and affect the regression result. To avoid including highly correlated variables, we study the correlation between the three individual ESG scores (esg\_env, esg\_soc, esg\_gov) and the overall ESG score (esg\_score). The multicollinearity problem, as can be seen in the correlation matrix, arises because the esg\_score variable is derived from a combination of the three individual ones. So, the three single esg variables are collinear both with each other and with the generic ESG score variable. The consequence is that a choice has to be made between the variables to be used in the regression models. In this study, the general ESG score variable is chosen because it encompasses all three basic ESG points, and with it the problem of collinearity does not arise.

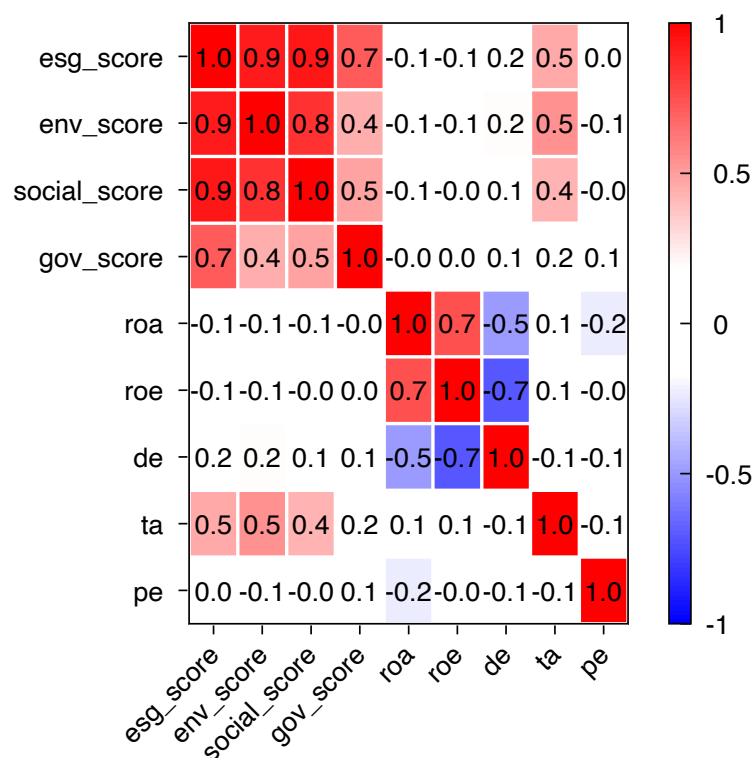


Figure 18: Variables Correlation Matrix

Another important assessment to be made is to see whether the chosen variables distribute like normal random variables. The results of the tests performed (Appendix 2) tell us that both

ROA, ROE and ESG score do not distribute like normal random variables. The Ordinary Least Square model assumes that the data are made in a certain Gaussian variable-like manner, hence two further problems arise, that of heteroscedasticity and that of autocorrelation between residuals and independent variables. In fact, the OLS model assumes homoscedasticity therefore a constant variance between residuals and independent variables. If there is heteroscedasticity, the model's standard errors will not be correct, and this will also have an impact on the t-ratio and t-value indicators as they depend on them. Without a corrected value of the standard errors, significance cannot be verified. The same applies if there is autocorrelation between the residuals and the independent variable. To prevent this problem from occurring, one condition of the model is to include robust standard errors.

The Gretl software allows to select the heteroscedasticity corrector (HC) before doing the regression. HC is a correction to the OLS estimator that allows you to estimate the standard error correctly even in the presence of heteroscedasticity. The model is corrected for the possible presence of heteroscedasticity.

From an initial quantitative and qualitative analysis of the variables, the two model equations can be derived, one for ROA as the dependent variable and one for ROE:

$$\text{roa} = \alpha + \beta_1 * \text{esg\_score} + \beta_2 * \text{ta} + \beta_3 * \text{de} + \beta_4 * \text{pe} + \varepsilon$$

$$\text{roe} = \alpha + \beta_1 * \text{esg\_score} + \beta_2 * \text{ta} + \beta_3 * \text{de} + \beta_4 * \text{pe} + \varepsilon$$

- Dependent variable, model 1 (ROA) = roa
- Dependent variable, model 2 (ROE) = roe
- Independent variable (ESG score) = esg\_score
- Control variable (D/E) = de
- Control variable (P/E) = pe
- Control variable (Total Asset) = ta

In the equations,  $\alpha$  represents the constant,  $\beta_n$  the regression coefficients of the independent variables and  $\varepsilon$  the stochastic error. The two equations were created based on the idea that all the variables that do not allow us to have good model validity are removed.

The first model to be analyzed is the one with ROA as the independent variable, investigating the relationship between ROA and the ESG score variables.

## MODEL 1

Model 1: OLS, using observations 1-58 (n = 54)  
 Missing or incomplete observations dropped: 4  
 Dependent variable: roa  
 Heteroskedasticity-robust standard errors, variant HC1

	coefficient	std. error	t-ratio	p-value	
const	4.86022	1.61165	3.016	0.0041	***
esg_score	-0.0190564	0.0300493	-0.6342	0.5289	
de	-0.000164153	1.33190e-05	-12.32	1.26e-16	***
ta	3.03412e-05	3.64301e-05	0.8329	0.4090	
pe	-0.0105144	0.00500183	-2.102	0.0407	**
Mean dependent var	3.746852	S.D. dependent var	4.471921		
Sum squared resid	767.3567	S.E. of regression	3.957315		
R-squared	0.276009	Adjusted R-squared	0.216908		
F(4, 49)	85.76491	P-value(F)	1.67e-21		
Log-likelihood	-148.2798	Akaike criterion	306.5596		
Schwarz criterion	316.5045	Hannan-Quinn	310.3950		

Excluding the constant, p-value was highest for variable 3 (esg\_score)

Figure 19: Model 1 (ROA)

The model used 54 observations instead of 58 for missing “de” values (Appendix 1), these values were not eliminated at the variable analysis stage as the ESG values of the 4 missing observed airlines will be needed for the subsequent study.

The p-value of the variables tells whether there is significance. If the p-value is less than 0.05, it is not possible to reject the null hypothesis and so the variables will be significant. The 0.05 value is called alpha or significance level. It represents a 95% confidence level, according to which one is sure to accept the null hypothesis in 95% of the cases when it is true and to be wrong to reject it in 5% of the cases when it is false. At the alpha significance level of 0.05

(5%) the ESG score variable is not significant because the p-value of ESG score is greater than 0.05. The null hypothesis is rejected, and its coefficient is equal to 0 or not significant. The model shows that there is no statistical significance for the ESG score variable but only for the two control variables D/E and P/E which, however, as mentioned above, have a supporting and not a main function in this research.

There are two important factors, apart from the p-value, to consider in the regression analysis. The first one is the F-stat indicator which must always have a very low P-value, as in this case, since its null hypothesis is that all coefficients are equal to zero, with a very low p-value the null hypothesis is rejected. The second indicator is the adjusted R-square because it tells how much the model explains the Y variations, in this case it is low and not sufficient. Thus, an adjusted R-square of 0.216908 can be interpreted in percentage terms as 21% of the ROA variations are explained by the independent variables. We take the adjusted R-square and not the simple R-square because the latter tends to increase with more independent variables.

A final point to be made about the model is about its residuals. The part of the variability that is not explained by the model constitutes the residual of the regression. In this case, the graphs show that residues behave in a similar way to a normal distribution (Figure 20). This strengthens the validity of the model. However, it is important to test this graphical evidence with numbers.

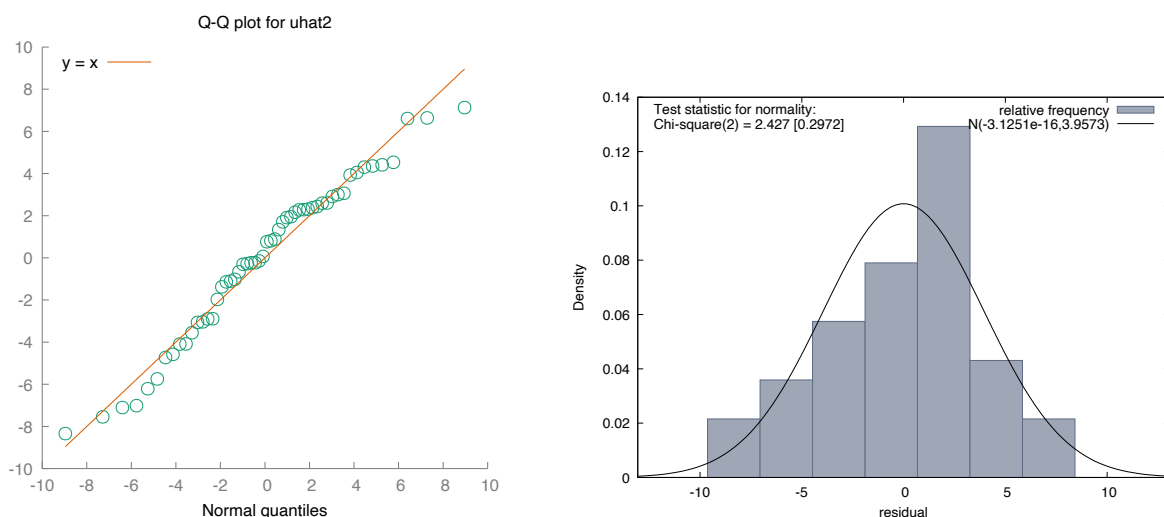


Figure 20: Residual Q-Q plot and Test for residual normality graph (Model 1)



To test the residual behavior is central to analyze the P-value of the Chi-Square, that represents the probability of committing first kind error. If the p-value is less than 0.05 the null hypothesis (in this case that the residual are distributed as a normal) has to be rejected and the alternative one accepted. In this case (Figure 21) the P-value of Chi-square is high (p-value = 0.297), so it's not possible to reject the null hypothesis and therefore the residuals appear to be distributed as a normal.

```

Frequency distribution for residual, obs 1-58
number of bins = 7, mean = -3.28955e-16, sd = 3.95731

      interval      midpt  frequency   rel.    cum.
      < -7.0521   -8.3415         3    5.56%   5.56% *
-7.0521 - -4.4733   -5.7627         5    9.26%  14.81% ***
-4.4733 - -1.8946   -3.1840         8   14.81%  29.63% *****
-1.8946 -  0.68417  -0.60521        11   20.37%  50.00% *****
 0.68417 -  3.2629    1.9736        18   33.33%  83.33% *****
 3.2629 -  5.8417    4.5523         6   11.11%  94.44% ***
      >= 5.8417    7.1311         3    5.56% 100.00% *

Missing observations = 4 ( 6.90%)

Test for null hypothesis of normal distribution:
Chi-square(2) = 2.427 with p-value 0.29720

```

Figure 21: Frequency distribution of residual (Model 1)

The same analysis procedure will be applied to verify the relationship between ROE and ESG score in the second model.

## MODEL 2

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Model 2: OLS, using observations 1-58 (n = 54)  
 Missing or incomplete observations dropped: 4  
 Dependent variable: roe  
 Heteroskedasticity-robust standard errors, variant HC1

	coefficient	std. error	t-ratio	p-value
const	9.37779	9.94164	0.9433	0.3502
esg_score	0.0704431	0.193681	0.3637	0.7176
de	-0.00191955	0.000195966	-9.795	3.98e-13 ***
ta	0.000112290	0.000219826	0.5108	0.6118
pe	-0.0290200	0.0316333	-0.9174	0.3634
Mean dependent var	9.485741	S.D. dependent var	35.17634	
Sum squared resid	31079.03	S.E. of regression	25.18464	
R-squared	0.526096	Adjusted R-squared	0.487410	
F(4, 49)	29.97306	P-value(F)	1.25e-12	
Log-likelihood	-248.2159	Akaike criterion	506.4318	
Schwarz criterion	516.3767	Hannan-Quinn	510.2672	

Excluding the constant, p-value was highest for variable 3 (esg\_score)

Figure 22: Model 2 (ROE)

Also this model used 54 observations instead of 58 for missing “de” values (Appendix 1). The results shows that there is no statistical significance for the ESG score variable but only for the control variables D/E that is not the focus of our research. The p-value of the ESG score variable is greater than 0.05 ( $0.717 > 0.05$ ), for the same reasons mentioned above no statistical significance is founded between ESG and ROE. Furthermore, the F-stat is very small, so it can be said that no coefficient is equal to 0. Lastly, the R-squared value is low (0.487), it means that only the 48% of the ROE variations are explained by the independent variables.

For this model as well, it is important to look at the behavior of the residuals through graphical and p-value analysis. The graphical analysis of the residuals does not show, unlike the first case, a behavior similar to that of the normal distribution (Figure 23).

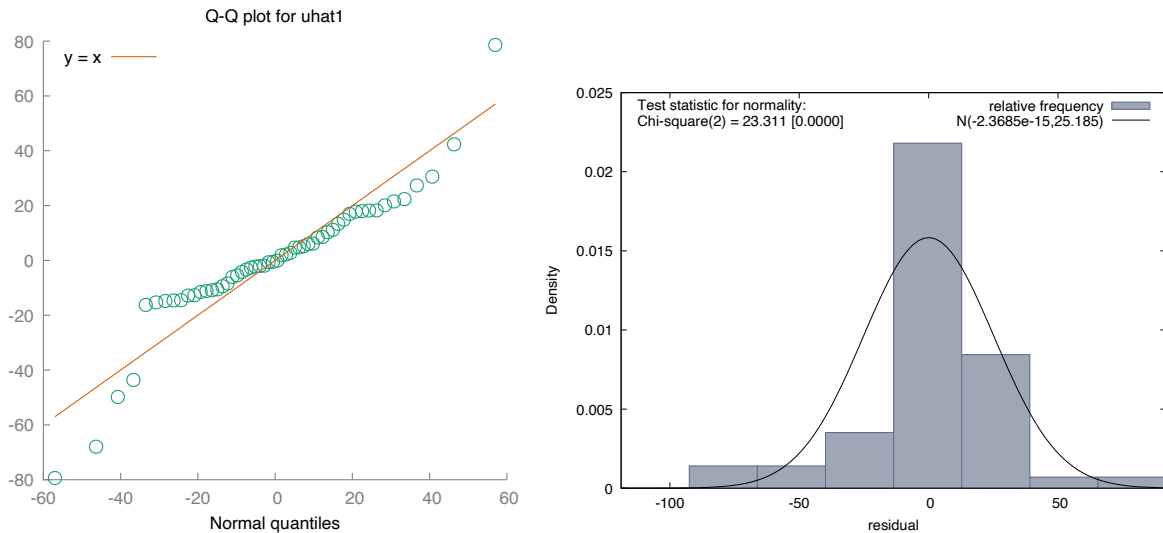


Figure 23: Residual Q-Q plot and Test for residual normality graph (Model 2)

In this case (Figure 24) the P-value of Chi-square is low (p-value = 0.00001), so it's possible to reject the null hypothesis and therefore the residuals appear to not be distributed as a normal.

Frequency distribution for residual, obs 1-58  
 number of bins = 7, mean = -2.36848e-15, sd = 25.1846

interval	midpt	frequency	rel.	cum.
< -66.194	-79.356	2	3.70%	3.70% *
-66.194 - -39.869	-53.031	2	3.70%	7.41% *
-39.869 - -13.544	-26.707	5	9.26%	16.67% ***
-13.544 - 12.781	-0.38162	31	57.41%	74.07% *****
12.781 - 39.106	25.943	12	22.22%	96.30% *****
39.106 - 65.431	52.268	1	1.85%	98.15%
>= 65.431	78.593	1	1.85%	100.00%

Missing observations = 4 ( 6.90%)

Test for null hypothesis of normal distribution:  
 Chi-square(2) = 23.311 with p-value 0.00001

Figure 24: Frequency Distribution for residual (Model 2)

To answer the second research question, seeing the results of the regression analysis it is not possible to say that there is a relationship between ESG scores and financial performance. Since this result come out, it cannot be said that if ESG score increases then financial performance also increases accordingly.

The third research question may seem similar to the second one but it actually refers to a very different hypothesis. In fact, the second hypothesis says that there is a positive relationship between ESG and financial indexes. Whereas the third hypothesis that we are going to test says that if an airline has a high ESG it also has a high financial performance ratio. In other words, if there is a difference in average performance between companies with a high ESG score and those with a low one.

To answer the third question, a dummy variable is created that puts a value of 0 or 1 depending on whether the ESG value is low or high, respectively, based on a threshold. The threshold decided for this assessment is an ESG score of 50 as the score varies from 0 to 100. The choice to put the threshold at 50 is due both to the fact that this is the average value of the ESG range and because Refinitiv itself assesses good ESG values from 50 onwards (Figure 5, Chapter 1). At this point, a statistic analysis is done to see if there is a difference in average ROA/ROE from a high or low ESG. The study will be done according to the T-test for independent samples method using an OLS regression with the dependent variables ROA/ROE and the independent variable ESG score dummy high/low. This new regression will have one ROA/ROE numeric variable and a dummy variable that only takes values 0 or 1.

### T-TEST 1

- Dependent variable (ROA) = roa
- Independent variable (ESG score Dummy) = Desg\_scoreb\_1

---

Model 1: OLS, using observations 1-58  
 Dependent variable: roa

	coefficient	std. error	t-ratio	p-value	
const	3.12348	1.04861	2.979	0.0043	***
Desg_scoreb_1	0.316522	1.34987	0.2345	0.8155	

Figure 25: T-test for independent samples (ROA)

The P-value of the ESG score is greater than 0.05 ( $0.8155 > 0.05$ ), consequently, the dummy variable is not significant. If a company has a high ESG score value (H), there is no significant difference on average in ROA compared to the one with low values (L).

This test takes companies in the sample that have a low ESG score and averages their performance and does the same thing for high ESG score values, as if dividing the sample into two groups and analyzing the average.

## T-TEST 2

- Dependent variable (ROE) = roe
- Independent variable (ESG score Dummy) = Desg\_scoreb\_1

Model 2: OLS, using observations 1-58 (n = 57)  
 Missing or incomplete observations dropped: 1  
 Dependent variable: roe

	coefficient	std. error	t-ratio	p-value
const	7.99087	7.21510	1.108	0.2729
Desg_scoreb_1	1.59531	9.34201	0.1708	0.8650

Figure 26: T-test for independent samples (ROE)

The same procedure is applied using ROE as the dependent variable, from Figure 26 it can be seen that the result does not change. The p-value of the variable ESG score is very high (0.865 > 0.05) and therefore not significant. In conclusion, there is no change in the average ROE if ESG score is low or high. The sample in this case fell to 57 instead of 58 companies due to a missing value of ROE (Appendix 1).

### 3.4 Result Discussion

Starting from the first two research questions presented at the beginning of this chapter, it is possible to state that there is no relationship between CFP and CSR for airlines. This result does not deviate too much from the literature, which is still uncertain on the subject. In both models, no statistical significance was found between the dependent variable (ROA or ROE depending on the model) and the independent variable ESG score. The study of the adjusted R-squared of the two models also failed to find a satisfactory explanation of the relationship between the variables. Moreover, significance was only found for some control variables, which, however, do not represent the focus of the research. In essence, what comes out of this

study is that there cannot be said to be a relationship between CFP and CSR. In the first model, the residuals are distributed as a normal. Whereas in the second model, the assumption of normality of the residuals is not fulfilled. If the residuals are normal, they confirm the validity of the model in terms of estimation, but if they are not normal, it does not necessarily mean that the result is not valid. Moreover, if the residuals are normal, they are also homoscedastic since normality implies homoscedasticity (as in Model 1). But it is not true that if they are not normal then they are not homoscedastic. Given the results of the regression analysis, it is not possible to say that higher ESG ranking leads to better financial performance as assumed by the second research hypothesis. For the third research question, it was assessed whether financial performance is higher on average when the ESG score variable is high or low. The value resulting from the T-test is not significant, so it can be derived that there is no significant difference on average performance between a high or low ESG score. However, this research has also some limitations. First, the number of airlines in the sample is very low, this is due to the limited availability of ESG data being it a relatively new topic. This limits the possibility of using more variables for the models because of the already cited Curse of Dimensionality problem. Another weakness of the model is the limited time-period examined (fiscal year 2019), using multi-year data would have implied more time series to be treated with panel data models. In conclusion, considering the reduced predictive capabilities of the statistical model used, it cannot be said that a CSR strategy may directly enhance a company's financial performance nor that a better ESG ranking is reflected in better financial performance. Lastly, it cannot be said either that on average financial performance is higher for airlines that have higher ESG scores. Despite these results, sustainability practices remain a key tool for airline companies to survive the competition and adapt to new regulations. It is no longer a choice to implement CSR strategies for airlines but a duty.

## CONCLUSION

The empirical outcome of the study cannot confirm the research questions. In fact, no significant relationship between ESG factors and financial performance of airlines was found for the sample. Since this result came out, it cannot be said that as the ESG score rises, so will the financial performance. These results are close to one current of thought from the literature, two examples are the works of Aupperle and Carroll (1985) and Mahapatra (1984). Also, for the additional research question, what comes out of the empirical study is that there is no significant difference on average performance between a high or low ESG score companies. However, these results should not be interpreted as meaning that these practices are useless and harmful, in fact, while there is no positive correlation there is no negative correlation either. These outcomes should be contextualized to the limitations that the statistical model used. As presented in the third chapter, due to the restricted availability of ESG data as it is a relatively new issue, there are very few airlines in the sample. Consequently, having a low number of observations also limited the possibility of having more independent variables in order to have a leaner and more consistent model. Moreover, the time-period analyzed is limited to a single fiscal year. By changing these circumstances, the result could change thus, this opens the door for further research. Notwithstanding the result, it is clear in fact, that today airline companies cannot survive without these types of sustainable strategies; in fact, the assumptions made in the first two chapters remain valid and rest on solid foundations.

Airline companies have suffered from the Covid-19 crisis-related recession and it has had a substantial influence on passenger travel, which has resulted in a sudden income drop. Following the suggestion given in the paper by Kuo, Chen and Meng (2021), future research could examine how Covid-19 and ESG factors are related to each other and the subsequent impact on financial performance. Moreover, further research could look into evaluating this relationship over a longer period of time and they could also consider as variable for CSR the ESG combined score which also takes into account companies' controversies.

In conclusion, to summarize the result of this paper, no valid relationship was found between CSR strategies and financial performance for airline companies and consequently it cannot be said that a higher ESG ranking lead to better financial performance. Furthermore, evidence from the empirical analysis does not confirm that on average financial performance is higher for companies with high ESG values. These results are in line with one of the currents in the literature, but this does not mean that airlines should ignore the context in which they find

themselves. ESG rankings are becoming increasingly important in the market and investor awareness should not be underestimated.

To conclude, sustainable practices and CSR strategies are key source of competitive advantage for airlines, which must take this into account when running their business, not to mention the fact that increasingly stringent rules will no longer allow unsustainable attitudes.



## REFERENCES:

- Abdi, Y., Li, X., & Càmara-Turull, X. (2020). Impact of Sustainability on Firm Value and Financial Performance in the Air Transport Industry. In *Sustainability* (Vol. 12, Issue 23, p. 9957). MDPI AG.
- Abdi, Y., Li, X., & Càmara-Turull, X. (2021). Exploring the impact of sustainability (ESG) disclosure on firm value and financial performance (FP) in airline industry: the moderating role of size and age. In *Environment, Development and Sustainability* (Vol. 24, Issue 4, pp. 5052–5079). Springer Science and Business Media LLC.
- Aguilera, R. V., Rupp, D. E., Williams, C. A., & Ganapathi, J. (2007). Putting the S Back in Corporate Social Responsibility: A Multilevel Theory of Social Change in Organizations. *The Academy of Management Review*, (Vol. 32, Issue 3, pp. 836–863).
- Airbus. (2022). Airbus Global Market Forecast 2022-2041
- Al-Tuwaijri, S. A., Christensen, T. E., & Hughes, K. E., II. (2004). The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach. In *Accounting, Organizations and Society* (Vol. 29, Issues 5–6, pp. 447–471). Elsevier BV.
- Alexander, G. J., & Buchholz, R. A. (1978). Research Notes. Corporate Social Responsibility and Stock Market Performance. In *Academy of Management Journal* (Vol. 21, Issue 3, pp. 479–486). Academy of Management.
- Alshehhi, A., Nobanee, H., & Khare, N. (2018). The Impact of Sustainability Practices on Corporate Financial Performance: Literature Trends and Future Research Potential. In *Sustainability* (Vol. 10, Issue 2, p. 494). MDPI AG.
- Artiach, T., Lee, D., Nelson, D., & Walker, J. (2010). The determinants of corporate sustainability performance. In *Accounting & Finance* (Vol. 50, Issue 1, pp. 31–51). Wiley.
- Aupperle, K. E., Carroll, A. B., & Hatfield, J. D. (1985). An Empirical Examination of the Relationship Between Corporate Social Responsibility and Profitability. In *Academy of Management Journal* (Vol. 28, Issue 2, pp. 446–463). Academy of Management.
- Barnett, M. L. (2007). Stakeholder influence capacity and the variability of financial returns to corporate social responsibility. In *Academy of Management Review* (Vol. 32, Issue 3, pp. 794–816). Academy of Management.

- Barnett, M. L., & Salomon, R. M. (2012). Does it pay to be really good? addressing the shape of the relationship between social and financial performance. In *Strategic Management Journal* (Vol. 33, Issue 11, pp. 1304–1320). Wiley.
- Becken, S., & Mackey, B. (2017). What role for offsetting aviation greenhouse gas emissions in a deep-cut carbon world? In *Journal of Air Transport Management* (Vol. 63, pp. 71–83). Elsevier BV.
- Bellavite Pellegrini, Dallochio, M., & Parazzini, E. (2020). Valutazione d'azienda nel mondo ESG. Egea.
- Bhattacharya, C. B., & Sen, S. (2004). Doing Better at Doing Good: When, Why, and How Consumers Respond to Corporate Social Initiatives. In *California Management Review* (Vol. 47, Issue 1, pp. 9–24). SAGE Publications.
- Bird, R., D. Hall, A., Momentè, F. et al. (2007) What Corporate Social Responsibility Activities are Valued by the Market? *J Bus Ethics* (Vol. 76, pp. 189–206).
- Birindelli, G., Ferretti, P., Intonti, M., & Iannuzzi, A. P. (2013). On the drivers of corporate social responsibility in banks: evidence from an ethical rating model. In *Journal of Management & Governance* (Vol. 19, Issue 2, pp. 303–340). Springer Science and Business Media LLC.
- Bowen, P.G., Gond, J., & Bowen, H.R. (2013). *Social Responsibilities of the Businessman*. (paper ed.). Iowa City: University of Iowa Press.
- Brammer, S. J., Brooks, C., & Pavelin, S. (2005). Corporate Social Performance and Stock Returns: UK Evidence from Disaggregate Measures. In *SSRN Electronic Journal*. Elsevier BV.
- Brammer, S., & Millington, A. (2008). Does it pay to be different? An analysis of the relationship between corporate social and financial performance. In *Strategic Management Journal* (Vol. 29, Issue 12, pp. 1325–1343). Wiley.
- Brown, J. A., & Forster, W. R. (2013). CSR and Stakeholder Theory: A Tale of Adam Smith. *Journal of Business Ethics*, (Vol. 112, Issue 2, pp. 301–312).
- Buchanan, B., Cao, C. X., & Chen, C. (2018). Corporate social responsibility, firm value, and influential institutional ownership. In *Journal of Corporate Finance* (Vol. 52, pp. 73–95). Elsevier BV.
- Cañón-de-Francia, J., & Garcés-Ayerbe, C. (2009). ISO 14001 Environmental Certification: A Sign Valued by the Market? In *Environmental and Resource Economics* (Vol. 44, Issue 2, pp. 245–262). Springer Science and Business Media LLC.

- Carroll, A. B. (1979) A three-dimensional conceptual model of corporate performance, *Academy of Management Review* (Vol. 4, pp. 497-505).
- Carroll, A. B. (1999). *Corporate Social Responsibility: evolution of a Definitional Construct*. (Vol. 38, Issue 3, pp. 268–295). SAGE Publications.
- Carroll, A. B. (2008) A history of corporate social responsibility: concepts and practices, in Crane, A. et al (eds), *The Oxford Handbook of Corporate Social Responsibility*, Oxford University Press (pp. 19-46).
- Cavaco, S., & Crifo, P. (2014). CSR and financial performance: complementarity between environmental, social and business behaviors. In *Applied Economics* (Vol. 46, Issue 27, pp. 3323–3338). Informa UK Limited.
- Cho, S., Chung, C., & Young, J. (2019). Study on the Relationship between CSR and Financial Performance. In *Sustainability* (Vol. 11, Issue 2, p. 343). MDPI AG.
- Cini, A. C., & Ricci, C. (2018). CSR as a Driver where ESG Performance will Ultimately Matter. In *Symphonya. Emerging Issues in Management* (Issue 1, pp. 68–75). Niccolo Cusano University-Rome Symphonya Emerging Issues in Management.
- Cochran, P. L., & Wood, R. A. (1984). Corporate Social Responsibility and Financial Performance. In *Academy of Management Journal* (Vol. 27, Issue 1, pp. 42–56). Academy of Management.
- Colangelo, G., & Giannaccari, A. (2006). *Strategie commerciali e politiche antitrust nel trasporto aereo*.
- Cowper-Smith, A., & de Grosbois, D. (2011). The adoption of corporate social responsibility practices in the airline industry. In *Journal of Sustainable Tourism* (Vol. 19, Issue 1, pp. 59–77). Informa UK Limited.
- Donaldson, T., & Preston, L. E. (1995). The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications. In *The Academy of Management Review* (Vol. 20, Issue 1, p. 65). Academy of Management.
- Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. In *Management Science* (Vol. 60, Issue 11, pp. 2835–2857). Institute for Operations Research and the Management Sciences (INFORMS).
- El Ghoul, S., Guedhami, O., Kim, H., & Park, K. (2014). Corporate Environmental Responsibility and the Cost of Capital: International Evidence. In *SSRN Electronic Journal*. Elsevier BV.

- El Ghoul, S., Guedhami, O., Kwok, C. C. Y., & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? In *Journal of Banking & Finance* (Vol. 35, Issue 9, pp. 2388–2406). Elsevier BV.
- European commission (2019) Sustainable aviation fuels – ReFuelEU Aviation
- Fatemi, A., Glaum, M., & Kaiser, S. (2018). ESG performance and firm value: The moderating role of disclosure. In *Global Finance Journal* (Vol. 38, pp. 45–64). Elsevier BV.
- Forsyth, P. (2011). Environmental and financial sustainability of air transport: Are they incompatible? In *Journal of Air Transport Management* (Vol. 17, Issue 1, pp. 27–32). Elsevier BV.
- Fransen, L. (2013). The Embeddedness of Responsible Business Practice: Exploring the Interaction Between National-Institutional Environments and Corporate Social Responsibility. *Journal of Business Ethics* (Vol. 115, Issue 2, pp. 213–227).
- Freeman, R. E. (1999). Divergent Stakeholder Theory. In *Academy of Management Review* (Vol. 24, Issue 2, pp. 233–236). Academy of Management.
- Freeman, R. E. (2004). The Stakeholder Approach Revisited. In *Zeitschrift für Wirtschafts- und Unternehmensethik* (Vol. 5, Issue 3, pp. 228–241). Nomos Verlag.
- Friedman, M. (1970). A Theoretical Framework for Monetary Analysis. In *Journal of Political Economy* (Vol. 78, Issue 2, pp. 193–238). University of Chicago Press.
- Galan, J. I. (2006). Corporate Social Responsibility and Strategic Management. In *Journal of Management Studies* (Vol. 43, Issue 7, pp. 1629–1641). Wiley.
- Griffin, J. J., & Mahon, J. F. (1997). The Corporate Social Performance and Corporate Financial Performance Debate. In *Business & Society* (Vol. 36, Issue 1, pp. 5–31). SAGE Publications.
- Haggmann, C., Semeijn, J., & Vellenga, D. B. (2015). Exploring the green image of airlines: Passenger perceptions and airline choice. In *Journal of Air Transport Management* (Vol. 43, pp. 37–45). Elsevier BV.
- Hamidu, A. A., Md Haron, H., & Amran, A. (2015). Corporate Social Responsibility: A Review on Definitions, Core Characteristics and Theoretical Perspectives. In *Mediterranean Journal of Social Sciences*. Richtmann Publishing.
- Harrison, J. S., & Wicks, A. C. (2013). Stakeholder Theory, Value, and Firm Performance. *Business Ethics Quarterly* (Vol. 23, Issue 1, pp. 97–124).

- Hart, S. L., & Milstein, M. B. (2003). Creating sustainable value. In *Academy of Management Perspectives* (Vol. 17, Issue 2, pp. 56–67). Academy of Management.
- Hazen, T. (2021). Social issues in the spotlight: the increasing need to improve publicly-held companies' csr and esg disclosures. *University of Pennsylvania Journal of Business Law* (Vol. 23, Issue 3, pp. 740-796).
- Hillman, A. J., & Keim, G. D. (2001). Shareholder Value, Stakeholder Management, and Social Issues: What's the Bottom Line? *Strategic Management Journal*, (Vol. 22, Issue 2, pp. 125–139).
- International Air Transport Association. (2018). IATA Annual review 2018
- International Air Transport Association. (2019). IATA Annual review 2019
- International Air Transport Association. (2020). IATA Annual review 2020
- International Air Transport Association. (2021). IATA Annual review 2021
- International Civil Aviation Organization (2019). ICAO ENV Report 2019
- International Civil Aviation Organization (2020). ICAO ENV Report 2020
- Janney, J. J., & Gove, S. (2011). Reputation and Corporate Social Responsibility Aberrations, Trends, and Hypocrisy: Reactions to Firm Choices in the Stock Option Backdating Scandal. In *Journal of Management Studies* (Vol. 48, Issue 7, pp. 1562–1585). Wiley.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. In *Journal of Financial Economics* (Vol. 3, Issue 4, pp. 305–360). Elsevier BV.
- Jones, T. M. (1995). Instrumental Stakeholder Theory: A Synthesis of Ethics and Economics. In *The Academy of Management Review* (Vol. 20, Issue 2, p. 404). Academy of Management.
- Kao, E. H., Yeh, C.-C., Wang, L.-H., & Fung, H.-G. (2018). The relationship between CSR and performance: Evidence in China. In *Pacific-Basin Finance Journal* (Vol. 51, pp. 155–170). Elsevier BV.
- Karwowski, M., & Raulinajtys-Grzybek, M. (2021). The application of corporate social responsibility (CSR) actions for mitigation of environmental, social, corporate governance (ESG) and reputational risk in integrated reports. In *Corporate Social Responsibility and Environmental Management* (Vol. 28, Issue 4, pp. 1270–1284). Wiley.

- Kim, K.-H., Kim, M., & Qian, C. (2015). Effects of Corporate Social Responsibility on Corporate Financial Performance: A Competitive-Action Perspective. In *Journal of Management* (Vol. 44, Issue 3, pp. 1097–1118). SAGE Publications.
- Kim, S., & Li, Z. (Frank). (2021). Understanding the Impact of ESG Practices in Corporate Finance. In *Sustainability* (Vol. 13, Issue 7, p. 3746). MDPI AG.
- Klein, J., & Dawar, N. (2004). Corporate social responsibility and consumers' attributions and brand evaluations in a product–harm crisis. In *International Journal of Research in Marketing* (Vol. 21, Issue 3, pp. 203–217). Elsevier BV.
- Kramer, M. R., and Pfitzer, M. W. (2016) The Ecosystem of Shared Value. *Harvard Business Review* 94, (Vol.10, pp. 80–89).
- Kuo, T.-C., Chen, H.-M., & Meng, H.-M. (2021). Do corporate social responsibility practices improve financial performance? A case study of airline companies. In *Journal of Cleaner Production* (Vol. 310, p. 127380). Elsevier BV.
- Lange, D., & Washburn, N. T. (2012). Understanding Attributions of Corporate Social Irresponsibility. In *Academy of Management Review* (Vol. 37, Issue 2, pp. 300–326). Academy of Management.
- Laufer, W. S. (2003). In *Journal of Business Ethics* (Vol. 43, Issue 3, pp. 253–261). Springer Science and Business Media LLC.
- Lee, H., Fridlind, A. M., & Ackerman, A. S. (2021). An evaluation of size-resolved cloud microphysics scheme numerics for use with radar observations Part II: Condensation and evaporation. In *Journal of the Atmospheric Sciences*. American Meteorological Society.
- Lee, S., & Park, S.-Y. (2009). Financial Impacts of Socially Responsible Activities on Airline Companies. In *Journal of Hospitality & Tourism Research* (Vol. 34, Issue 2, pp. 185–203). SAGE Publications.
- Lepoutre, J., Dentchev, N. A., & Heene, A. (2007). Dealing with Uncertainties When Governing CSR Policies. *Journal of Business Ethics*, 73(4), 391–408.
- Li, X., Du, J., & Long, H. (2019). Dynamic analysis of international green behavior from the perspective of the mapping knowledge domain. In *Environmental Science and Pollution Research* (Vol. 26, Issue 6, pp. 6087–6098). Springer Science and Business Media LLC.
- Livesey, S. M., & Kearins, K. (2002). Transparent and Caring Corporations? In *Organization & Environment* (Vol. 15, Issue 3, pp. 233–258). SAGE Publications.

- Lu, J., Ren, L., Lin, W., He, Y., & Streimikis, J. (2018). Policies to promote Corporate social responsibility (CSR) and assessment of CSR impacts. In *E+M Ekonomie a Management* (Vol. 22, Issue 1, pp. 82–98). Technical University of Liberec.
- Mahapatra, S. (1984). Investor Reaction to a Corporate Social Accounting. In *Journal of Business Finance & Accounting* (Vol. 11, Issue 1, pp. 29–40). Wiley.
- Malkiel, B. G., & Fama, E. F. (1970). Efficient Capital Markets: A Review Of Theory And Empirical Work\*. In *The Journal of Finance* (Vol. 25, Issue 2, pp. 383–417). Wiley.
- Margolis, J. D., & Walsh, J. P. (2003). Misery Loves Companies: Rethinking Social Initiatives by Business. In *Administrative Science Quarterly* (Vol. 48, Issue 2, pp. 268–305). JSTOR.
- Margolis, J. D., Elfenbein, H. A., & Walsh, J. P. (2009). Does it Pay to Be Good...And Does it Matter? A Meta-Analysis of the Relationship between Corporate Social and Financial Performance. In *SSRN Electronic Journal*. Elsevier BV.
- Márquez, A., & Fombrun, C. J. (2005). Measuring Corporate Social Responsibility. In *Corporate Reputation Review* (Vol. 7, Issue 4, pp. 304–308). Springer Science and Business Media LLC.
- Mazareanu, E. (2020). Coronavirus: impact on the transportation and logistics industry worldwide. Statista.
- McGuire, J. B., Sundgren, A., & Schneeweis, T. (1988). Corporate Social Responsibility And Firm Financial Performance. In *Academy of Management Journal* (Vol. 31, Issue 4, pp. 854–872). Academy of Management.
- McKinsey. (2021). Transport Intelligence. Travel, Logistic and Infrastructure
- McWilliams, A., & Siegel, D. (2000). Corporate social responsibility and financial performance: correlation or misspecification? In *Strategic Management Journal* (Vol. 21, Issue 5, pp. 603–609). Wiley.
- McWilliams, A., & Siegel, D. (2001). Corporate Social Responsibility: A Theory of the Firm Perspective. In *The Academy of Management Review* (Vol. 26, Issue 1, p. 117). Academy of Management.
- Milgrom, P., & Roberts, J. (1995). Complementarities and fit strategy, structure, and organizational change in manufacturing. In *Journal of Accounting and Economics* (Vol. 19, Issues 2–3, pp. 179–208). Elsevier BV.

- Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. In *The Academy of Management Review* (Vol. 22, Issue 4, p. 853). Academy of Management.
- Mosca, F., & Civera, C. (2017). The Evolution of CSR: An Integrated Approach. In *Symphonia. Emerging Issues in Management* (Issue 1, pp. 16–35). Niccolo Cusano University-Rome Symphonia Emerging Issues in Management.
- Moskowitz, M. (1972) Choosing Socially Responsible Stocks. *Business & Society Review* (Issue 1, pp. 71-75).
- Navarro, P. (1988). Why Do Corporations Give to Charity? *The Journal of Business* (Vol. 61, Issue 1, pp. 65–93).
- Nirino, N., Santoro, G., Miglietta, N., & Quaglia, R. (2021). Corporate controversies and company’s financial performance: Exploring the moderating role of ESG practices. In *Technological Forecasting and Social Change* (Vol. 162, p. 120341). Elsevier BV.
- Organization for Economic Cooperation and Development. (2014)
- Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate Social and Financial Performance: A Meta-Analysis. In *Organization Studies* (Vol. 24, Issue 3, pp. 403–441). SAGE Publications.
- Park, J., Lee, H., & Kim, C. (2014). Corporate social responsibilities, consumer trust and corporate reputation: South Korean consumers’ perspectives. In *Journal of Business Research* (Vol. 67, Issue 3, pp. 295–302). Elsevier BV.
- ReportLinker (2022). Air Transport Global Market Report 2022. GlobeNewswire News Room.
- Ringbeck, J., & Koenig, T.-M. (2021). The Impact of COVID-19 on the Path to Climate Neutral Air Transport - An Empirical Investigation. In *SSRN Electronic Journal*. Elsevier BV.
- Roberts, P. W., & Dowling, G. R. (2002). Corporate reputation and sustained superior financial performance. In *Strategic Management Journal* (Vol. 23, Issue 12, pp. 1077–1093). Wiley.
- Rowley, T., & Berman, S. (2000). A Brand New Brand of Corporate Social Performance. In *Business & Society* (Vol. 39, Issue 4, pp. 397–418). SAGE Publications



- Ruf, B. M., Muralidhar, K., & Paul, K. (1998). The Development of a Systematic, Aggregate Measure of Corporate Social Performance. In *Journal of Management* (Vol. 24, Issue 1, pp. 119–133). SAGE Publications.
- Ruf, B. M., Muralidhar, K., Brown, R. M., Janney, J. J., & Paul, K. (2001). An Empirical Investigation of the Relationship Between Change in Corporate Social Performance and Financial Performance: A Stakeholder Theory Perspective. In *Journal of Business Ethics* (Vol. 32, Issue 2, pp. 143–156). Springer Science and Business Media LLC.
- Russo, M. V., & Fouts, P. A. (1997). A Resource-Based Perspective On Corporate Environmental Performance And Profitability. In *Academy of Management Journal* (Vol. 40, Issue 3, pp. 534–559). Academy of Management.
- Sánchez, P. E., & Benito-Hernández, S. (2015). CSR Policies: Effects on Labour Productivity in Spanish Micro and Small Manufacturing Companies. *Journal of Business Ethics* (Vol. 128, Issue 4, pp. 705–724).
- Schipper, Y., Rietveld, P., & Nijkamp, P. (2001). Environmental externalities in air transport markets. In *Journal of Air Transport Management* (Vol. 7, Issue 3, pp. 169–179). Elsevier BV.
- Sen, A. (1988). Chapter 1 The concept of development. In *Handbook of Development Economics* (pp. 9–26). Elsevier.
- Seo, K., Moon, J., & Lee, S. (2015). Synergy of corporate social responsibility and service quality for airlines: The moderating role of carrier type. *Journal of Air Transport Management*, 47, 126–134.
- Soria Baledón, M., & Kosoy, N. (2018). “Problematizing” carbon emissions from international aviation and the role of alternative jet fuels in meeting ICAO’s mid-century aspirational goals. In *Journal of Air Transport Management* (Vol. 71, pp. 130–137). Elsevier BV.
- Surroca, J., Tribó, J. A., & Waddock, S. (2009). Corporate responsibility and financial performance: the role of intangible resources. In *Strategic Management Journal* (Vol. 31, Issue 5, pp. 463–490). Wiley.
- Thomson Reuters - Refinitiv Report 2021
- Upham, P., Maughan, J., Raper, D., & Thomas, C. (Eds.). (2012). *Towards Sustainable Aviation*. Routledge.

- Varenova, D., Samy, M., & Combs, A. (2013). Corporate social responsibility and profitability: trade-off or synergy. In *Sustainability Accounting, Management and Policy Journal* (Vol. 4, Issue 2, pp. 190–215). Emerald. <https://doi.org/10.1108/sampj-may-2012-0020>
- Votaw, D. and Sethi, S.P. (1973) *The Corporate Dilemma: Traditional Values versus Contemporary Problems*. New York: Prentice Hall.
- Waddock, S. A., & Graves, S. B. (1997). The Corporate Social Performance-Financial Performance Link. *Strategic Management Journal*, (Vol.18, Issue 4, pp. 303–319).
- Walsh, G., Mitchell, V.-W., Jackson, P. R., & Beatty, S. E. (2009). Examining the Antecedents and Consequences of Corporate Reputation: A Customer Perspective. In *British Journal of Management* (Vol. 20, Issue 2, pp. 187–203). Wiley.
- Wang, Z., & Sarkis, J. (2017). Corporate social responsibility governance, outcomes, and financial performance. In *Journal of Cleaner Production* (Vol. 162, pp. 1607–1616). Elsevier BV.
- Weber, O. (2014). The financial sector’s impact on sustainable development. In *Journal of Sustainable Finance & Investment* (Vol. 4, Issue 1, pp. 1–8). Informa UK Limited.
- Williamson, O. E. (1964). *The economics of discretionary behavior: Managerial objectives in a theory of the firm*. Prentice-Hall.
- Wood, D. J. (1991). Corporate Social Performance Revisited. In *The Academy of Management Review* (Vol. 16, Issue 4, p. 691). Academy of Management.
- Wood, D. J., & Jones, R. E. (1995). Stakeholder Mismatching: A Theoretical Problem In Empirical Research On Corporate Social Performance. In *The International Journal of Organizational Analysis* (Vol. 3, Issue 3, pp. 229–267). Emerald.
- Yang, A. S., & Baasandorj, S. (2017). Exploring CSR and financial performance of full-service and low-cost air carriers. In *Finance Research Letters* (Vol. 23, pp. 291–299). Elsevier BV.

# APPENDICES

## APPENDIX I

List of Companies:

	<b>id</b>	<b>company</b>
1	WIZZ.L	Wizz Air Holdings PLC
2	HVN.HM	Vietnam Airlines JSC
3	UAL.OQ	United Airlines Holdings Inc
4	THYAO.IS	Turk Hava Yollari AO
5	THAI.BK	Thai Airways International PCL
6	601021.SS	Spring Airlines Co Ltd
7	SAVE.N	Spirit Airlines Inc
8	LUV.N	Southwest Airlines Co
9	SKYW.OQ	SkyWest Inc
10	SIAL.SI	Singapore Airlines Ltd
11	SAS.ST	SAS AB
12	RYA.I	Ryanair Holdings PLC
13	QAN.AX	Qantas Airways Ltd
14	PGSUS.IS	Pegasus Hava Tasimaciligi AS
15	NAS.OL	Norwegian Air Shuttle ASA
16	MESA.OQ	Mesa Air Group Inc
17	LTM.SN	LATAM Airlines Group SA
18	003490.KS	Korean Air Lines Co Ltd
19	603885.SS	JUNEYAO AIRLINES Co Ltd
20	JBLU.OQ	JetBlue Airways Corp
21	JET2.L	Jet2 PLC
22	9201.T	Japan Airlines Co Ltd
23	ICAG.L	International Consolidated Ai~
24	INGL.NS	Interglobe Aviation Ltd
25	HA.OQ	Hawaiian Holdings Inc
26	600221.SS	Hainan Airlines Holding Co Ltd
27	AEROMEX.MX	Grupo Aeromexico SAB de CV

28	GOLL4.SA	Gol Linhas Aereas Inteligente~
29	ULCC.OQ	Frontier Group Holdings Inc
30	FIA1S.HE	Finnair Oyj
31	EIF.TO	Exchange Income Corp
32	2618.TW	Eva Airways Corp
33	EZJ.L	Easyjet PLC
34	LHAG.DE	Deutsche Lufthansa AG
35	DAL.N	Delta Air Lines Inc
36	CPA.N	Copa Holdings SA
37	VOLARA.MX	Controladora Vuela Compania d~
38	CHR.TO	Chorus Aviation Inc
39	600029.SS	China Southern Airlines Co Ltd
40	600115.SS	China Eastern Airlines Corp Ltd
41	2610.TW	China Airlines Ltd
42	0293.HK	Cathay Pacific Airways Ltd
43	CAP1.KL	Capital A Berhad
44	VTOL.N	Bristow Group Inc
45	AZUL.N	Azul SA
46	AVT_p.CN	Avianca Holdings SA
47	AAV.BK	Asia Aviation PCL
48	9202.T	ANA Holdings Inc
49	AAL.OQ	American Airlines Group Inc
50	ALGT.OQ	Allegiant Travel Co
51	ALK.N	Alaska Air Group Inc
52	AIR.NZ	Air New Zealand Ltd
53	AIRF.PA	Air France KLM SA
54	601111.SS	Air China Ltd
55	AC.TO	Air Canada
56	AFLT.MM	Aeroflot-Rossiyskiye Avialini~
57	AGNr.AT	Aegean Airlines SA
58	ACEh.V	ACE Aviation Holdings Inc

List of Variables:

- **Independent variables:**

	esgscore	env	social	gov		esgscore	env	social	gov
1	56.60	39.61	57.17	74.46	30	69.20	59.46	73.48	73.63
2	11.17	0.47	12.59	20.83	31	25.49	13.54	30.27	31.60
3	49.43	49.98	50.66	47.03	32	52.63	78.47	51.88	25.31
4	75.62	70.11	84.29	68.90	33	55.18	49.59	42.91	79.39
5	41.61	48.94	55.07	13.74	34	71.01	79.61	79.71	48.74
6	26.65	14.29	25.67	41.70	35	69.59	74.11	80.52	48.54
7	38.28	14.34	45.86	53.45	36	23.28	5.35	37.77	21.67
8	68.10	83.90	76.57	38.25	37	58.81	46.33	59.05	72.20
9	23.25	15.29	24.39	30.31	38	56.99	21.20	66.58	82.23
10	71.90	66.45	73.34	75.79	39	73.90	68.31	67.66	89.24
11	77.36	64.88	78.93	88.77	40	63.57	49.89	61.63	81.49
12	42.15	22.83	49.03	53.28	41	84.38	88.24	90.98	70.44
13	71.08	68.38	64.46	83.80	42	55.16	65.94	70.95	20.06
14	65.60	54.96	62.32	82.15	43	63.49	48.81	68.91	71.68
15	19.70	12.44	19.44	28.09	44	31.21	17.83	43.03	28.52
16	29.72	1.21	38.12	48.74	45	44.81	37.86	50.40	44.23
17	71.16	65.37	78.87	66.16	46	77.99	86.04	72.76	76.82
18	75.80	65.90	82.98	76.12	47	29.03	31.68	28.29	27.21
19	23.30	7.53	27.01	35.17	48	79.00	85.10	83.17	66.14
20	52.79	38.07	40.21	87.51	49	69.47	59.98	66.57	84.18
21	22.02	14.79	27.82	21.42	50	26.09	4.54	34.55	37.34
22	63.61	74.13	56.38	62.68	51	49.40	34.41	41.68	77.27
23	66.57	80.20	66.54	51.64	52	62.03	51.30	59.69	77.29
24	55.80	31.08	55.74	83.07	53	78.32	74.77	88.58	67.14
25	32.88	12.40	25.72	65.93	54	59.27	62.27	49.79	69.93
26	26.94	15.37	29.26	36.25	55	64.36	54.92	59.40	82.05
27	54.41	47.01	43.60	78.46	56	46.22	32.18	49.59	56.72
28	50.12	40.56	45.26	67.79	57	54.54	39.21	81.80	31.27
29	20.34	4.52	26.28	29.01	58	16.96	2.01	26.89	18.80

- **Dependent variables:**

	roa	roe		roa	roe
1	3.57	11.23	30	2.38	9.87
2	4.27	18.18	31	5.01	15.71
3	7.70	36.29	32	2.03	8.17
4	3.85	13.68	33	5.67	13.83
5	-4.22	-68.49	34	4.60	18.76
6	8.60	16.95	35	9.93	42.68
7	7.15	20.83	36	6.67	15.73
8	11.34	30.04	37	6.22	90.69
9	6.88	21.56	38	6.00	30.59
10	3.34	7.01	39	1.47	5.23
11	2.33	12.56	40	1.66	6.61
12	7.40	19.58	41	-0.04	-0.16
13	5.97	33.55	42	0.25	0.79
14	8.03	30.79	43	-0.33	-1.60
15	-2.39	-57.90	44	-1.93	-3.18
16	4.33	15.81	45	-14.41	0.00
17	0.69	4.32	46	-12.14	-176.24
18	-3.08	-27.42	47	-1.39	-3.07
19	5.12	12.39	48	5.87	14.60
20	6.71	16.20	49	3.74	0.00
21	5.78	30.84	50	10.94	38.28
22	8.04	13.62	51	8.50	25.14
23	7.14	32.88	52	4.46	16.55
24	-0.64	-2.10	53	1.15	16.89
25	8.33	30.05	54	3.38	8.98
26	0.50	1.60	55	7.15	46.24
27	-3.74	-38.12	56	1.45	0.00
28	3.03	-	57	10.37	35.21
29	0.00	0.00	58	-2.45	-2.51

- **Control variables:**

	de	ta	pe		de	ta	pe
1	127.44	4424.45	16.75	30	162.96	4347.13	11.90
2	171.62	3299.59	20.41	31	156.75	1745.39	19.20
3	128.51	52611.00	7.52	32	134.53	11911.19	18.43
4	194.81	24724.00	5.29	33	63.72	10029.86	13.04
5	1252.39	8562.10	0.00	34	97.96	47820.77	5.91
6	63.55	4218.27	21.62	35	72.67	64532.00	7.96
7	98.14	7043.41	8.23	36	70.29	4357.38	13.65
8	27.11	25895.00	12.82	37	822.71	3344.52	7.58
9	137.61	6657.13	9.17	38	304.04	2268.36	9.65
10	48.63	22504.76	15.45	39	239.73	44046.94	35.86
11	189.78	3524.60	2.42	40	229.52	40641.21	28.09
12	69.88	14863.38	15.22	41	196.63	9797.99	0.00
13	228.57	14415.58	9.44	42	154.93	27537.36	27.02
14	201.34	3540.63	6.51	43	442.80	6259.41	0.00
15	938.25	9721.92	0.00	44	34.85	764.52	0.00
16	198.02	1451.92	3.89	45	-	4776.68	137.50
17	331.26	21087.81	31.97	46	93987.28	7273.91	0.00
18	612.19	23407.70	0.00	47	79.38	2113.66	0.00
19	115.93	4760.00	29.37	48	71.09	24243.25	10.94
20	48.64	11918.00	9.58	49	-	59995.00	5.47
21	209.45	4113.24	8.66	50	160.92	3010.80	12.01
22	11.86	18317.65	8.51	51	34.61	12993.00	10.50
23	200.20	39983.86	6.39	52	130.37	5119.03	10.80
24	31.84	3617.64	334.57	53	486.08	34453.96	13.73
25	70.65	4126.62	6.38	54	136.37	42266.88	21.96
26	187.78	30155.69	0.00	55	210.05	21376.10	9.12
27	1097.87	5336.24	0.00	56	29380.31	15073.18	10.63
28	-	3806.53	19.11	57	165.02	1494.80	7.58
29	45.20	3864.00	0.00	58	-	5.26	0.00

- **ESG score Dummy variable (high ESG score = 1, Low ESG score = 0)**

1	1	33	1
2	0	34	1
3	0	35	1
4	1	36	0
5	0	37	1
6	0	38	1
7	0	39	1
8	1	40	1
9	0	41	1
10	1	42	1
11	1	43	1
12	0	44	0
13	1	45	0
14	1	46	1
15	0	47	0
16	0	48	1
17	1	49	1
18	1	50	0
19	0	51	0
20	1	52	1
21	0	53	1
22	1	54	1
23	1	55	1
24	1	56	0
25	0	57	1
26	0	58	0
27	1		
28	1		
29	0		
30	1		
31	0		
32	1		



## APPENDIX 2

Studying whether variables distribute like normal random variables:

### - ROA

```
Test for normality of roa:  
  
Doornik-Hansen test = 12.3348, with p-value 0.00209669  
  
Shapiro-Wilk W = 0.921869, with p-value 0.0011335
```

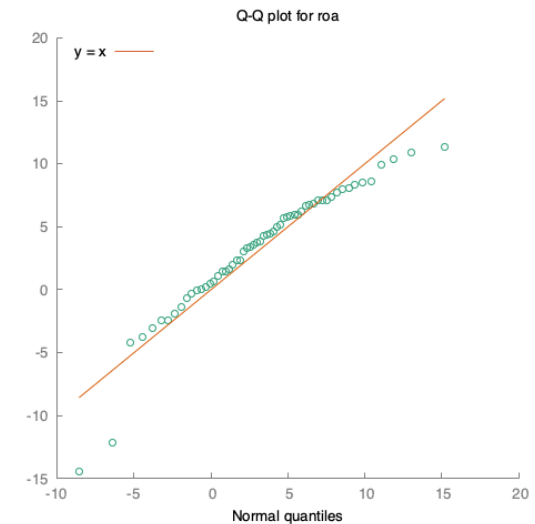
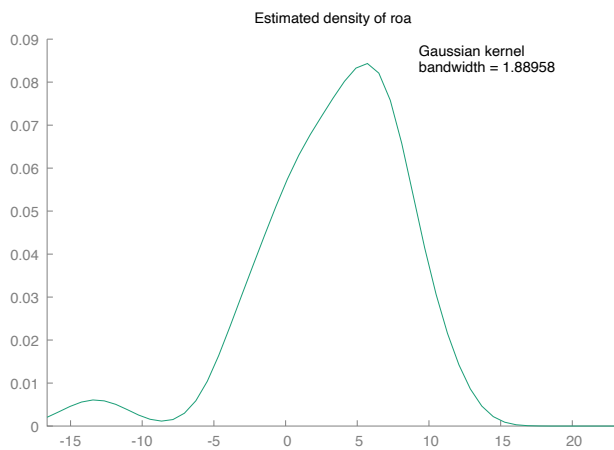
#### Test for normality (ROA)

Shapiro-Wilk is the most famous test especially for small samples to test the normality of a variable. If the p-value is smaller than alpha which is usually set to 0.05, the null hypothesis is rejected. Thus, in this case, the hypothesis that the sample values are distributed as a normal random variable is rejected.

```
Summary statistics, using the observations 1 - 58  
for the variable 'roa' (58 valid observations)  
  
Mean                3.3145  
Median              4.0600  
Minimum             -14.410  
Maximum             11.340  
Standard deviation   4.9871  
C.V.                1.5046  
Skewness            -1.2011
```

#### Summary statistics (ROA)

Another way to test whether the distribution is normal is to look at the Skewness factor in the summary statistics. To be distributed as normal the value should be 0, in this case it is negative so the distribution will be shifted to the left.



Residual Test for normality graph and Q-Q plot (ROA)

Another analysis is the graphical one which confirms the results highlighted by the numerical tests.

**- ROE**

Test for normality of roe:

Doornik-Hansen test = 45.8956, with p-value 1.08117e-10

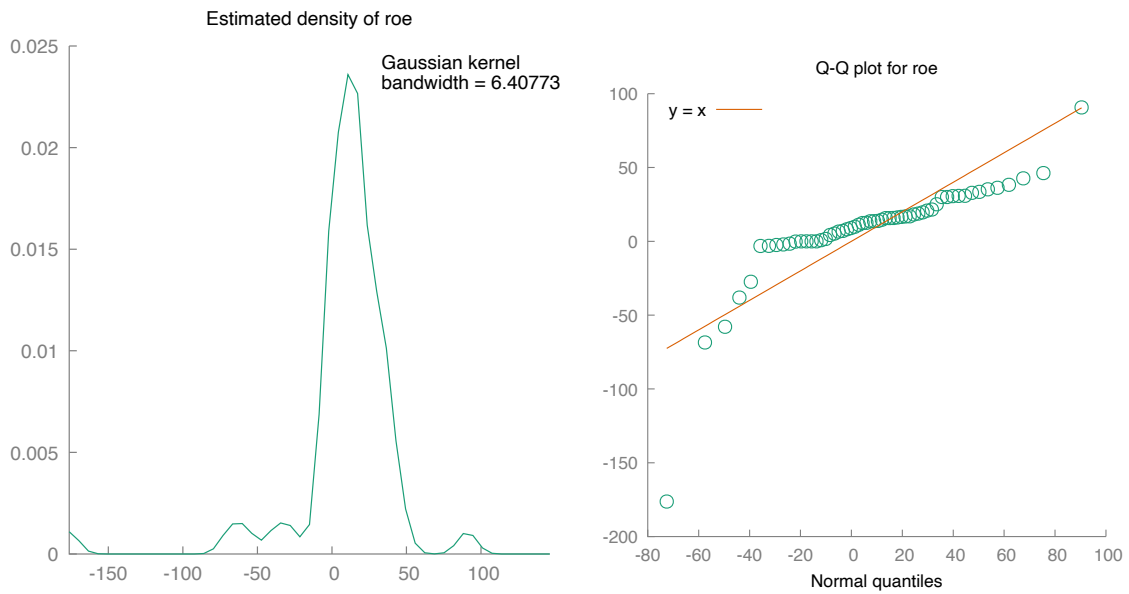
Shapiro-Wilk W = 0.709081, with p-value 2.52987e-09

Test for normality (ROE)

Summary statistics, using the observations 1 – 58 for the variable 'roe' (57 valid observations)

Mean	8.9425
Median	13.680
Minimum	-176.24
Maximum	90.690
Standard deviation	34.301
C.V.	3.8358
Skewness	-2.8948

Summary statistics (ROE)



Residual Test for normality graph and Q-Q plot (ROE)

As with ROA, the distribution of ROE does not appear to be distributed as normal and seems to be shifted to the left (Shapiro-Wilk p-value < 0.05, negative Skewness factor and graphical analysis).

- **ESG score**

```

Test for normality of esg_score:

Doornik-Hansen test = 9.43266, with p-value 0.00894796

Shapiro-Wilk W = 0.937368, with p-value 0.004981

```

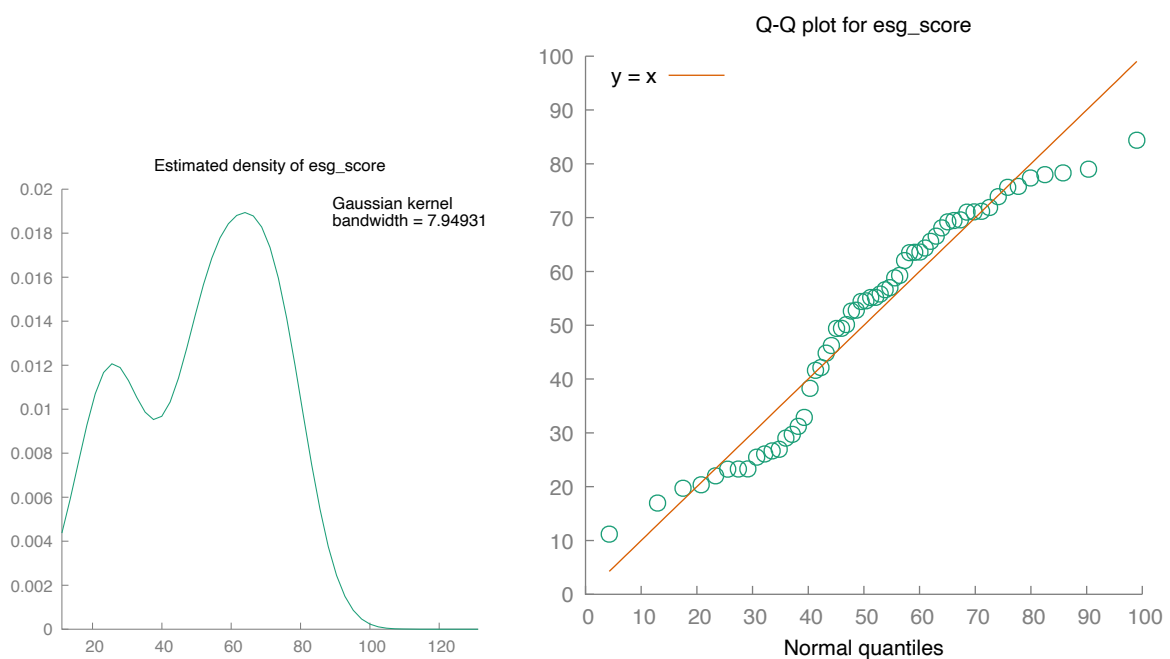
Test for normality (ESG score)

---

Summary statistics, using the observations 1 – 58  
for the variable 'esg\_score' (58 valid observations)

Mean	51.644
Median	55.170
Minimum	11.170
Maximum	84.380
Standard deviation	19.896
C.V.	0.38526
Skewness	-0.35288

Summary statistics (ESG score)



Residual Test for normality graph and Q-Q plot (ESG score)

As with the other variables, even the distribution of ESG score does not appear to be distributed as normal and seems to be shifted to the left (Shapiro-Wilk p-value < 0.05, negative Skewness factor and Graphs).

## **SUMMARY**

### **INTRODUCTION**

Recently, it has become imperative to consider a company together with the context in which it operates. The current situation is certainly geared toward a sustainable market perspective. The concept of sustainability, which originated in the 1950s, has only recently become much more widespread. Every type of industry has been affected by this new trend that has dictated the new market rules. Despite the recognized importance on the subject, the goal of a company is still to make profit, which is why the question about financial performance arises. Do corporate social responsibility strategies lead to better financial performance for the company? General interest in the topic has also stimulated the curiosity of investors that demand more transparency from companies about their practices. For this reason, it was necessary to develop rankings that could assess performance and assign scores to companies regarding their environmental, social and governance (ESG) practices. Lately, the ESG rankings moved from a minor to a major role even in the decision-making of private investors. This work sets out to analyze these and other aspects of ESG factors and CSR practices with a special focus on the airline industry. The choice to analyze the airline industry stems from the importance it has for social progress and the evidence that sustainability has been taking on, recently, for this sector. However, while the economic and social advantages of global air transportation are evident, the aviation industry's environmental costs and externalities are enormous (Schipper, Rietveld & Nijkamp, 2001; Upham, Maughan, Raper & Thomas, 2012). Through a thorough review of the literature and a framing of the airline industry, the study will proceed with an empirical analysis to explore the relationship between ESG factors and financial performance for the airlines.

### **CHAPTER 1 Theoretical Framework: CSR and ESG Factors**

Nowadays, companies do not act in isolation; they live in an ecosystem where social factors may limit their markets and the productivity of their stakeholders (Kramer & Pfitzer, 2016). From this perspective, the debates on sustainability and Corporate Social Responsibility (CSR) take on a richer significance. The neoclassical paradigm of the efficient, self-regulating market has now been replaced by many economists (Fama, 1970; Sen, 1988); and the corrective function that CSR can have in a market with strong information asymmetries was recognized accordingly (Moskowitz, 1972, 1975). Recently, there has been an increase in demand for

Corporate Social Responsibility activities, however the cost-effectiveness aspect of corporate action remains relevant, and it must not destroy value. As a result, the number of industry leaders or consulting firms that provide CSR research, environmental, social, and governance (ESG) indices, expert advice, and ratings has increased significantly. However, the notion of CSR has a long and extensive literature (Mosca & Civera, 2017), with roots dating back to the 1950s in both the United States and Europe (Carroll 1999). Howard Bowen, known as the "Father of Corporate Social Responsibility," defined CSR as "the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society" (Bowen, 1953). According to Carroll (2008), the entire concept of CSR in this early time was related to corporate philanthropy. Since then, CSR has evolved from philanthropy to regulated practices and finally to instrumental/strategic CSR. Corporations are increasingly being pressured to comply with environmental rules, transparency, and the market is flooded with rivals in the new century, forcing the use of CSR as a strategy to survive and be more efficient (Glan, 2006). The CSR history and its literature are extensive and multi-faceted. According to Votaw and Sethi (1973), "Social responsibility means something, but not always the same thing to everybody". Corporate social responsibility (CSR) is defined by McWilliams and Siegel (2001) as "actions that appear to further some social good, beyond the interests of the firm and that which is required by law". There are fundamentally two conflicting perspectives that have characterized the evolution of the idea of Corporate Social Responsibility over time: the Shareholders Value Theory and the Stakeholders Value Theory. The Shareholders Value Theory prioritizes the creation of value and profit for the organization's shareholders, in this case CSR policies are implemented only if they can generate value for them. The Stakeholders Value Theory, on the other hand, aims to produce value for the company's whole group of stakeholders and it is more related to the concept of CSR (Freeman, 2004). According to this theory, the better a company handles its relationships with its stakeholders, the more successful it will be in the long run (Barnett & Salomon, 2012). Consequently, companies have begun to see themselves as part of a larger economic system and have begun to reveal their CSR activities through a measurement of their environmental, social, and governance (ESG) performance. Stakeholders are often skeptical of a company's efforts in the sphere of social responsibility, since in many cases they are seen only as a way of gaining a reputational advantage over competitors (Laufer, 2003). One of the major issues related to CSR is how its activities affect the financial performance of a company. The discussion about the link between corporate social responsibility (CSR) and corporate financial performance (CFP) has been fueling the debate among academics for a long

time now (Alexander & Buchholz, 1978). There is yet to be an agreement on whether CSR improves financial performances. There are several reasons for the difficulty to develop a consensus on the implications of better social performance on financial performance. One of them is the theoretical expectations of the Corporate Social Performance (CSP), as well as its conceptual drivers, that are yet underdeveloped (Wood and Jones, 1995; Rowley and Berman, 2000; Margolis and Walsh, 2003). CSP is a multidimensional concept that includes a wide spectrum of corporate behavior in terms of resources, procedures, and outcomes (Carroll, 1979; Waddock and Graves, 1997). On the other hand, CFP is easier to measure because very often the data are public from companies' balance sheets. The financial measures most used to calculate CFP in the academic works are *Tobin's q* ratio, return on equity (ROE), return on sales, growth in sales and return on asset (ROA). The way the CSR and CFP concepts are operationalized and quantified is one of the most generally recognized reasons for the ambiguous empirical outcomes. Finally, few prior studies explicitly evaluate the temporal horizon across which CSP and CFP are associated in their research.

The results produced by many studies on the relationship between CSR/ESG practice and financial performance are not homogeneous but rather mixed (McWilliams et al., 2006). The relationship between the two variables is not simply cause and effect but it involves many factors and aspects to be considered. The previous literature about this relationship is divided into two currents of thoughts, those that argue a positive correlation and those that argue a negative one. The first study stream concludes that the increased money generated through CSR practices outweighs the costs. Some academics, on the other hand, claims that the expenditures of doing CSR operations outweigh the returns, resulting in a profit drop. There are also many researchers in the debate who position themselves in the middle either with a mixed perspective or by not finding an effective correspondence between CSP and CFP. Aside from disagreements on the structure of the relationship between social and financial performance, there is also disagreement over the time horizon over which such interconnections could emerge. This is dependent on when the costs and rewards of excellent social performance occur. The current study's findings imply that improvements in CSP have both immediate and long-term financial consequences. While it seems logical for companies to implement actions related to protecting the environment and communities, they do not always invest a sufficient amount of their budget in CSR initiatives. In this case, the actions and choices of managers that are not aligned with sustainability principles can result in litigation and have a negative impact on their reputation (Janney and Gove, 2011). In addition,

scandals and controversies can undermine a company's reputation and thus negatively impact the company's performance (Walsh et al., 2009).

Despite these considerations, the researchers argue that ESG factors are essential to meet the needs of stakeholders and improve the reputation of the company. Whereas in the past the sole objective of the company was to create value for the shareholders, stakeholder theory has revolutionized this perspective by shifting the company's objective towards the interests and needs of the stakeholders. (Freeman, 1999). The resource-based view is not alone in arguing that a company's commitment to sustainable activities towards society and the environment helps to develop a competitive advantage. The company not only improves its reputation (Kim et al., 2015) but also develops unique skills and competences that are difficult to reproduce. Stakeholder response to a multiplicity of disputes by a company has reason to generate a decline in financial performance; especially for listed companies, disputes may have a greater resonance due to possible market overreaction. Many researchers argue that investing in ESG practices has a positive impact on financial performance. (Bird et al., 2007; Margolis et al., 2009). This result is possible by exploiting the competitive advantage gained by implementing these investments and the trust that is built up between the company and its stakeholders in the long term (Birindelli et al., 2013). Two types of sustainable practices are identified to respond to stakeholder pressure: symbolic or substantive. The first are made to show stakeholders a positive image of the company; these symbolic practices are only effective in the short term as they do not require investment of large resources and can lead to a loss of credibility if repeated over time (Kim et al., 2015). On the contrary, substantive practices imply costs that may not show great results in the short term but can have a great impact on performance in the long run (Wang and Sarkis, 2017).

Many researchers categorize different CSR activities into three main pillars called ESG factors: environmental, social and corporate governance. ESG factors are also considered as financial performance indicators. According to the Financial Times, "ESG is a term commonly used by investors to assess corporate activities related to environmental, social and governance areas". As a result of the developments explained in the previous paragraphs, there has been an increase in demand for CSR ratings (so called Sustainability Ratings).

Sustainability has been one of the most significant trends in financial markets for decades, both on the side of investors, seeking a sustainable and responsible investment, and on the side of company management. As a result of these indicators, the number of organizations that provide CSR ratings to investors and consumers has expanded, and CSR ratings have become the primary means of communicating ESG corporate performance (Márquez & Fombrun, 2005).



Thomson Reuters Datastream and Bloomberg are two main providers of ESG indicators that build their analysis with distinct modalities that lead to slightly different results. The first database is based on the actual availability of data while the second is based on a reconstruction of the clues available at the corporate level. According to Thomson Reuters - Refinitiv Report 2021, more of 500 ESG measurements are taken into consideration for each company, then, in order to produce comparable scores, they are reduced to 186. These data are grouped into ten categories constructed to arrive at an overall score that is broken down into three macro-sector scores: *Environmental, Social, Governance*; further divided into sub-sectors that analyze specific elements. On the other hand, the ESG controversies score is produced based on 23 ESG controversial subjects. If a scandal arises during the year, the firm concerned is penalized, and this has an impact on their total ESGC score and grading. The influence of an event may be also observed in the following year, and as the situation unfolds, all fresh media items are recorded. The controversies score also considers the market size bias that large-cap corporations face since they receive more media attention than smaller-cap companies. Their ESG Ratings range from leader (A+, A, A-), average (B+, B, B-, C+, C, C-) to laggard (D+, D, D-) according to which level of percentile score the companies got.

A salient aspect of a company's financial performance relates to the risk exposure an investor would have if they decided to undertake an investment based on an ESG score and how the financial riskiness of a listed company may be affected by any upgrades or downgrades.

## **CHAPTER 2 Airline Industry Overview**

Transportation and mobility are two driving forces of the social progress. The global air transport market is estimated to increase at a compound annual growth rate (CAGR) of 11.6% from \$653.05 billion in 2021 to \$728.61 billion in 2022. Moreover, it is expected to reach \$1,332.45 billion in 2026 at a CAGR of 16.3%. The market is segmented by type of services, by distance and by end-use. There are three main types of air transport services: passenger air transport, private and public chartered air transport, and air cargo services. These services could cover long-distances or short-distances and the end-use could be private or commercial. Among all types of transport, according to a McKinsey study, air transport ranks first in terms of revenue in the travel sector and last in logistics with Air Cargo, this result highlights the high importance of the passenger air transport field.

Historically, the market environment has not been a competitive one: most of the airlines in the world except those of the United States were state-owned and considered as "flag carriers" and

valued national assets by governments. Open Skies policies and the adoption of a market-oriented approach to the operation of international air services, have been in place since 1992. After the liberalization, the airlines picture in the EU has drastically transformed, with the emergence, and indeed predominance, of low-cost carriers (LCCs), significant changes in business models and pricing practices by traditional "legacy" airlines, a large increase in the number of routes operated and points connected, and strong downward pressure on fares. Furthermore, state control of major airlines in each member state has almost disappeared. Another consequence of market liberalization was the opportunity for cooperation and consolidation between airlines that allows them to extend and diversify their network, grow and rationalize their costs without increasing their own aircraft capacity or route offering.

Air passenger transport is a very young sector, it started about one hundred years ago. Some improvements have been made about energy efficiency; however, CO<sub>2</sub>-footprint remains a relevant problem. This market has a strong dependency on macro trends such as globalization, sustainability, terrorism, and pandemics. While the economic and social advantages of global air transportation are evident, the aviation industry's environmental costs and externalities are enormous (Schipper, Rietveld & Nijkamp, 2001; Upham, Maughan, Raper & Thomas, 2012). Public concern is increasingly sensitive to the issues of climate change and global warming, which is why the aviation sector is also suffering from external pressure towards a carbon neutral future even though it is responsible for only 3.5% of anthropogenic climate forcing (Lee et al., 2021). The European Union through the Green Deal has also set itself the goal of achieving climate neutrality by 2050, not only revising the key pillars of the climate policy but also creating a new legislative proposal such as "ReFuelEU" that supports the development of sustainable alternative transport fuels (European Commission, 2019). Although the aviation industry's commitment to sustainability and external pressure about it, the overall carbon emissions in the period among 2014 and 2019 have increased by almost 46%. The major reason for this rise is due to the tremendous increase in global aviation travel in recent decades (IATA, 2020a; Mazareanu, 2020). One possibility for airlines to be more energy efficient is to provide fleet renewal processes. Another solution that can lead to visible results in the short-term regarding decarbonization is definitely SAFs. According to IATA, "Sustainable aviation fuel (SAF) is the main term used by the aviation industry to describe a nonconventional (fossil derived) aviation fuel." One of the major benefits they would bring is the ability to cut CO<sub>2</sub> emissions by 80%. The problem with SAFs is that there are not enough incentives to produce and consequently buy them. High production costs and volatile oil prices do not provide security for investors and producers. Shifting the perspective to long-term choices (around

20/30 years), two alternatives could be the use of green hydrogen as a fuel and the introduction of electric aircraft. However, these innovations require large R&D investments and national and international programs to support the transition. On July 2021, the European Commission adopted sustainable legislative proposals in order to achieve climate neutrality in the EU by 2050 in which hydrogen plays an important role. It is also important to consider the point of view of the end consumers and not just the production part. Carbon neutrality is not viewed as a quality characteristic by all the customers, whom are also unwilling to pay for it. As more and more people choose shorter destinations using other types of transportation, it is still uncertain if consumers will absorb higher ticket costs in the future or whether airlines would need to dramatically cut their flight capabilities due to “sustainability” costs. This poses the fundamental question of how important global mobility is for society and what are the consequences of the carbon-neutral extra cost on wellbeing especially on tourism countries or among lower-income population groups. Moreover, the decarbonization process pursued by the institutions must not only aim at the environmental objective but also at creating a future competitive market in order to achieve a global result. The goal of the airlines should be to secure long-term commercial advantages in a climate-neutral flight business with new aviation technologies investments and thus ensure sustainable competitiveness.

At the moment, corporate social responsibility (CSR) is the source of competitive advantages in the aviation business, which operates in a competitive environment. The performance of environmental, social, and governance (ESG) factors has grown to be a crucial sustainable development approach impacting businesses' total performance (Eccles et al., 2014). CSR initiatives are being looked into by several airlines; there is significant concern regarding the effects of CSR adoption on business financial performance, particularly for airlines with high capital intensity and large external debt. In light of this, full-service carriers (FSCs) primarily do environmental CSR operations (Cowper-Smith and de Grosbois, 2011).

In terms of corporate social responsibility (CSR), low-cost carriers (LCCs) are typically seen as having the lowest environmental sensitivity. However, the transportation sector is frequently noted to have below-average participation in CSR activities (Hagmann et al., 2015). In terms of sustainability and environmental effect, it is recognized as one of the most difficult industries. This is because there are questions about whether financial and environmental sustainability can coexist. The direct conflict between sustainability and economics policies is best shown by the air transportation industry, which also serves as a useful starting point for research into how airlines may balance societal efforts in their corporate strategy. For airlines, achieving financial sustainability is possible, but achieving environmental sustainability raises

financial concerns for the company as well as the sector as a whole. According to Forsyth (2011): “*Good policies achieve environmental sustainability at minimum cost in terms of other objectives or equivalently achieve the maximum environmental benefits consistent with an acceptable level of economic and financial performance*”. An essential management tool to integrate ESG strategy into the business will be a complete carbon management system that will track and optimize airline decarbonization in all company operations (such as ground operations and supply chains).

The most common ESG strategies adopted by airlines concern environmental issues. In fact, the common goal is to decrease the amount of CO<sub>2</sub> emissions. There are also many other activities that concern the environment such as local noise pollution caused by aircraft. These kinds of problems, however, are secondary, because at the center of criticism there are CO<sub>2</sub> emissions and their impact on climate change. Moreover, airline companies implement social practices both internally and externally. Internally the focus is on the employees' all-round wellbeing, while externally the initiatives concern humanitarian and charity projects. Internal policies, on the other hand, focus on ensuring a fair work-life balance, ensuring quality and safety in the working environment and, finally, ensuring free health services. An important social practice in the airline industry is to ensure training and educational opportunities for employees to help them progress in their careers and ensure proper service. As recent trends show us, an eye must be kept on the concept of diversity. In October 2019, IATA launched an initiative “25by2025” to increase gender balance throughout the industry. When evaluating ESG practices it is vital to take the variable of ownership into account, especially for airline companies. Private ownership, public ownership, or mixed ownership are three types of ownership, and the control power increases with the percentage of ownership. According to a research by Kao et al. (2018), private airlines do the best financially in the short term, followed by state-owned airlines and mixed-ownership airlines. Usually mixed-ownership airlines perform the worst on CSR practices, and this is due to issues with leadership and culture that may not be strong enough. Moreover, in this type of ownership significant conflicts of interest could emerge between management and stockholders. All these elements affect the short-term financial performance of the company in a negative way. This study cited above has shown how the type of ownership considerably modifies the influence of ESG performance indicators on ROA. Another important practice related to corporate governance that airline companies put effort on is the composition of the board of directors. This factor is crucial to enhance the long-term value of the company and protect the shareholders' interest. Most of the policies focus on diversity and inclusion especially for what it concerns gender diversity.

Analyzing the empirical result of a study about ESG and CFP applied to the airline industry, it emerged that ESG initiatives affect firm's market-to-book ratio and corporate financial performance in opposite directions (Abdi & Càmarà-Turull, 2021). This research demonstrated how social and environmental operations improvements would lead to a decline in firm's market-to-book ratio but increase in Tobin's q (representation of CFP). Also in this case, they found a moderating and significant role of firm size in the relationship. A study from Kuo et al. (2021) demonstrated that using ESG performance as a measure and indicator of CSR could effectively determine the KPIs affecting short-term corporate performance and focusing on ownership, it suggested to provide managers with references for long-term strategic planning for the implementation and improvement of CSR to exhibit a success in the financial performance. Lastly, a very interesting study from Abdi & Càmarà-Turull (2020) showed how an increase in environmental and governance pillar disclosures leads to a higher market-to-book ratio and financial performance of airlines. As a consequence, an airline company should invest in CSR practices, such as reusable resources, innovation, reducing emissions, better management structure, and implementation of a sustainability policy in order to be more attractive for the investors and create a competitive advantage in the market. On the other hand, this study showed that airline's social activities result in lower market value and level of financial performance, social pillar was found to be negatively associated with both a firm's value and its financial performance. The outcome of these multiple studies highlights the importance of considering sustainability practices in the industry. Although many similarities, these studies sometimes contradict each other and leave wide margins for new research. The purpose of this work is to expand the literature on the subject; the empirical study will be carried out in the next chapter.

### **CHAPTER 3 Empirical Analysis**

The analysis of the literature in the previous chapters does not provide a clear and univocal view of the relationship between CSR and financial performance. This work aims to study the possible correlation phenomenon between the two variables; and more specifically to observe whether the adoption of sustainable policies can lead to better financial results for airline companies. A further analysis is done to find out whether a company with high ESG also has high financial performance ratios. This leads to the definition of three research questions:

*1: Is there any relationship between Corporate Social Responsibility and Corporate Financial Performance for airline companies?*

*2: Higher ESG ranking score can lead to better financial performance for airline companies?*

*3: Is there a difference on average financial performance between airline companies with a high ESG score and those with a low one?*

The uniqueness of this study focuses on using the objective values of ESG rankings to evaluate the social performance of companies and on the type of industry studied. The transportation industry and more specifically the airlines that are part of it, have well-defined peculiarities that are different from any other industry as it is described in the previous chapter. The recent emphasis on sustainability in this area and the controversial literature lay the groundwork for further research.

To give an answer to the three research questions introduced above, it is appropriate to resort to statistical analysis through objective data found on airline companies around the world. Considering that our purpose is to assess the existence of a relationship between two factors and if it exists with what correlation, the statistical tool used is the regression model. The type of regression used in this work is the OLS (Ordinary Least Square) regression method which aims to find a function, represented by a regression curve, which is as close as possible to a set of data. All the data used in the model are retrieved from the Thomson Reuters database, Eikon Datastream, one of the biggest providers of ESG rankings that build its analysis on the actual availability of data. The sample of the study consists of 58 airline companies from all over the world for which financial and social performance data could be found on the database. Furthermore, the study will analyze the fiscal year 2019, the choice could have been more recent years such as 2020 or 2021, but the occurrence of a global pandemic has affected the industry in all respects. The Multiple Linear regression has three types of variables: dependent variable, independent variables, and control variables.

Taking into consideration the aim of the study, the dependent variable will be the corporate financial performance of the airline companies. The most used measures to calculate this quantity, also from the literature reviewed, are ROA and ROE both expressed as a percentage. The study will carry out two regressions to see if and which of the two chosen dependent variables is influenced by the independent variables. The data are taken from the companies' 2019 financial summary on Refinitiv. Each financial data is expressed in US dollars. Since the starting point of the model is a multiple linear regression, the independent variables will be more than one. More specifically, to measure the corporate social responsibility of a company, ESG rankings available on Refinitiv database will be used. The ESG score is the main and most

used score because it covers and includes all three ESG ranking categories. The ESG environmental, ESG social and ESG governance scores, instead, encompass the individual categories of environment, social and governance respectively. In addition, ESG combined score is calculated as the weighted average of the ESG scores (positive) and ESG controversies (negative) score per fiscal period. The list of airlines with their respective scores was reduced from 121 to 58 airlines as some data was incomplete or non-available. The ROA and ROE variables are affected by many different factors that can influence the result of the regression, which is why we need the control variables. Following the literature, this study will use as control variables three financial factors: the debt-to-equity ratio, the price earnings ratio and the total assets. Considering the reflections made on the literature and the definition of the sample and the variables, we now proceed with the statistical models. To answer the first and main question, the research model is composed by two multiple linear regressions. The dependent variable in the first is ROA, whereas the dependent variable in the second is ROE. The regression will be done using the Gretl Software. Since the sample is low, the problem of Curse or Dimensionality could arise, according to which one must be careful about the ratio between the number of variables used in the regression and the number of observations available. For this reason, the aim is to have fewer variables for a leaner model. To decide which to eliminate from the study, there is a further problem to be assessed, namely that of correlation. The correlation between the independent variables, in fact, generates collinearity between the variables which could affect the regression result. The correlation matrix analysis showed that the control variables are not too closely related to each other and can therefore be kept without having much effect on the model. Between the independent variables, on the other hand, the problem of collinearity arises and thus the estimation of the coefficient will then be wrong and affect the regression result. In this study, the general ESG score variable is chosen because it encompasses all three basic ESG points, and with it the problem of collinearity does not arise. Another important assessment to be made is to see whether the chosen variables distribute like normal random variables. The results of the tests performed tell us that both ROA, ROE and ESG score do not distribute like normal random variables. The Ordinary Least Square model assumes that the data are made in a certain Gaussian variable-like manner, hence two further problems arise, that of heteroscedasticity and that of autocorrelation between residuals and independent variables. To prevent these problems from occurring, one condition of the model is to include robust standard errors. The Gretl software allows to select the heteroscedasticity corrector (HC) before doing the regression. From an initial quantitative and

qualitative analysis of the variables, the two model equations can be derived, one for ROA as the dependent variable and one for ROE:

$$roa = \alpha + \beta_1 * esg\_score + \beta_2 * ta + \beta_3 * de + \beta_4 * pe + \varepsilon$$

$$roe = \alpha + \beta_1 * esg\_score + \beta_2 * ta + \beta_3 * de + \beta_4 * pe + \varepsilon$$

- Dependent variable, model 1 (ROA) = roa, model 2 (ROE) = roe
- Independent variable (ESG score) = esg\_score
- Control variables (D/E) = de, (P/E) = pe, (Total Asset) = de

In the equations,  $\alpha$  represents the constant,  $\beta_n$  the regression coefficients of the independent variables and  $\varepsilon$  the stochastic error. The two equations were created based on the idea that all the variables that do not allow us to have good model validity are removed. The first model to be analyzed is the one with ROA as the independent variable, investigating the relationship between ROA and the ESG score variables.

### MODEL 1 - ROA

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Model 1: OLS, using observations 1-58 (n = 54)
Missing or incomplete observations dropped: 4
Dependent variable: roa
Heteroskedasticity-robust standard errors, variant HC1

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	coefficient	std. error	t-ratio	p-value	
const	4.86022	1.61165	3.016	0.0041	***
esg_score	-0.0190564	0.0300493	-0.6342	0.5289	
de	-0.000164153	1.33190e-05	-12.32	1.26e-16	***
ta	3.03412e-05	3.64301e-05	0.8329	0.4090	
pe	-0.0105144	0.00500183	-2.102	0.0407	**
Mean dependent var	3.746852	S.D. dependent var	4.471921		
Sum squared resid	767.3567	S.E. of regression	3.957315		
R-squared	0.276009	Adjusted R-squared	0.216908		
F(4, 49)	85.76491	P-value(F)	1.67e-21		
Log-likelihood	-148.2798	Akaike criterion	306.5596		
Schwarz criterion	316.5045	Hannan-Quinn	310.3950		

Excluding the constant, p-value was highest for variable 3 (esg\_score)

The p-value of the variables tells whether there is significance. If the p-value is less than 0.05, it is not possible to reject the null hypothesis and so the variables will be significant. Therefore, the first model shows that there is no statistical significance for the ESG score variable. Another important indicator is the adjusted R-square because it tells how much the model explains the Y variations, in this case it is low and not sufficient. Thus, an adjusted R-square of 0.216908 can be interpreted in percentage terms as 21% of the ROA variations are explained by the independent variables. The same analysis procedure will be applied to verify the relationship between ROE and ESG score in the second model.



## MODEL 2 - ROE

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Model 2: OLS, using observations 1–58 (n = 54)  
Missing or incomplete observations dropped: 4  
Dependent variable: roe  
Heteroskedasticity-robust standard errors, variant HC1

	coefficient	std. error	t-ratio	p-value
const	9.37779	9.94164	0.9433	0.3502
esg_score	0.0704431	0.193681	0.3637	0.7176
de	-0.00191955	0.000195966	-9.795	3.98e-13 ***
ta	0.000112290	0.000219826	0.5108	0.6118
pe	-0.0290200	0.0316333	-0.9174	0.3634
Mean dependent var	9.485741	S.D. dependent var	35.17634	
Sum squared resid	31079.03	S.E. of regression	25.18464	
R-squared	0.526096	Adjusted R-squared	0.487410	
F(4, 49)	29.97306	P-value(F)	1.25e-12	
Log-likelihood	-248.2159	Akaike criterion	506.4318	
Schwarz criterion	516.3767	Hannan-Quinn	510.2672	

Excluding the constant, p-value was highest for variable 3 (esg\_score)

Even in this model, the results shows that there is no statistical significance for the ESG score variable. Furthermore, the R-squared value is quite low, it means that only the 48% of the ROE variations are explained by the independent variables.

To answer the second research question, seeing the results of the regression analysis it is not possible to say that there is a relationship between ESG scores and financial performance. Since this result come out, it cannot be said that if ESG score increases then financial performance also increases accordingly.

The third research question may seem similar to the second one but it actually refers to a very different hypothesis. The next analysis will test if an airline that has a high ESG score, also has a high financial performance ratio. In other words, if there is a difference in average performance between companies with a high ESG score and those with a low one. To answer third question, a dummy variable is created that puts a value of 0 or 1 depending on whether the ESG value is low or high, respectively, based on a threshold. The threshold decided for this assessment is an ESG score of 50 as the score varies from 0 to 100. The choice to put the threshold at 50 is due both to the fact that this is the average value of the ESG range and because Refinitiv itself assesses good ESG values from 50 onwards. At this point, a statistic analysis is done to see if there is a difference in average ROA/ROE from a high or low ESG. The study will be done according to the T-test for independent samples method using an OLS regression with the dependent variables ROA/ROE and the independent variable ESG score dummy high/low. This new regression will have one ROA/ROE numeric variable and a dummy variable that only takes values 0 or 1.

### T-TEST 1 - ROA

- Dependent variable (ROA) = roa
- Independent variable (ESG score Dummy) = Desg\_scoreb\_1

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Model 1: OLS, using observations 1-58  
Dependent variable: roa

	coefficient	std. error	t-ratio	p-value	
const	3.12348	1.04861	2.979	0.0043	***
Desg_scoreb_1	0.316522	1.34987	0.2345	0.8155	

The P-value of the ESG score is greater than 0.05, consequently, the dummy variable is not significant. If a company has a high ESG score value (H), there is no significant difference on average in ROA compared to the one with low values (L).

### T-TEST 2 - ROE

- Dependent variable (ROE) = roe
- Independent variable (ESG score Dummy) = Desg\_scoreb\_1

Model 2: OLS, using observations 1-58 (n = 57)  
Missing or incomplete observations dropped: 1  
Dependent variable: roe

	coefficient	std. error	t-ratio	p-value
const	7.99087	7.21510	1.108	0.2729
Desg_scoreb_1	1.59531	9.34201	0.1708	0.8650

The same procedure is applied using ROE as the dependent variable, from the figure above it can be seen that the result does not change. The p-value of the variable ESG score is very high and therefore not significant. In conclusion, there is no change in the average ROE if ESG score is low or high.

Starting from the first two research questions presented at the beginning of this chapter, it is possible to state that there is no relationship between CFP and CSR for airlines. In both models, no statistical significance was found between the dependent variable (ROA or ROE depending on the model) and the independent variable ESG score. The study of the adjusted R-squared of the two models also failed to find a satisfactory explanation of the relationship between the variables. Moreover, significance was only found for some control variables, which, however, do not represent the focus of the research. In essence, what comes out of this study is that there cannot be said to be a relationship between CFP and CSR. Given the results of the regression

analysis, it is not possible to say that higher ESG ranking leads to better financial performance as assumed by the second research hypothesis. For what concerns the third research question, the value resulting from the T-test is not significant, so it can be derived that there is no significant difference on average performance between a high or low ESG score. This research has also some limitations. First, the number of airlines in the sample is very low, this is due to the limited availability of ESG data being it a relatively new topic. This limits the possibility of using more variables for the models because of the already cited Curse of Dimensionality problem. Another weakness of the model is the limited time-period examined (fiscal year 2019), using multi-year data would have implied more time series to be treated with panel data models.

## **CONCLUSION**

The empirical outcome of the study cannot confirm the research questions. In fact, no significant relationship between ESG factors and financial performance of airlines was found for the sample. Since this result come out, it cannot be said that as the ESG score rises, so will the financial performance. These results are close to one current of thought from the literature, two examples are the works of Aupperle and Carroll (1985) and Mahapatra (1984). Also, for the additional research question, what comes out of the empirical study is that there is no significant difference on average performance between a high or low ESG score companies. However, these results should not be interpreted as meaning that these practices are useless and harmful, in fact, while there is no positive correlation there is no negative correlation either. These outcomes should be contextualized to the limitations that the statistical model used, as presented in the third chapter. Since airline companies have suffered from the Covid-19 crisis-related recession, following the suggestion given in the paper by Kuo, Chen and Meng (2021), future research could examine how Covid-19 and ESG factors are related to each other and the subsequent impact on financial performance. Moreover, further research could look into evaluating this relationship over a longer period of time and they could also consider as variable for CSR the ESG combined score which also takes into account companies' controversies. To conclude, sustainable practices and CSR strategies are key source of competitive advantage for airlines, which must take this into account when running their business, not to mention the fact that increasingly stringent rules will no longer allow unsustainable attitudes.

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