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Performance Drivers in a Sustainability-Oriented Economy

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Abstract. *A sustainable agri-food system is characterized by its ability to ensure economic sustainability, thereby fostering long-term financial viability, to create broad benefits for society, promoting social sustainability, and to contribute to environmental sustainability. The sustainable development of companies is predicated on financial performance, which is instrumental in satisfying the demands of all interested parties. A focus on sustainability has the potential to catalyze innovation, resulting in the development of new products and services that meet the growing demand for environmentally friendly options. The purpose of this study is to investigate the relationship between financial performance and sustainability performance for companies that realize food and agriculture revenue, as an indicator of the green economy. The analyzed sample consists of all listed companies worldwide that reported these revenues, from the Refinitiv Eikon database. The regression analysis revealed the existence of a statistically significant negative relationship between return on equity and ESG score, but not between Women Employees Score and return on equity, respectively between FA Food and Agriculture and return on equity. The findings of the study, which contribute to the research of the relationship, with particularization at the level of companies that generate food and agriculture revenue, will provide valuable insights to scholars, given the conflicting results of previous studies. Furthermore, business managers in the industry will find guidance on adopting best practices to improve financial performance while guaranteeing sustainability performance, and policymakers will be able to adopt strategies to boost sustainability performance and profitability.*

Keywords: performance, sustainability, gender equality, FA Food and Agriculture, green economy.

Introduction

Agriculture is one of the world's most significant sources of environmental pressure (DeBoe, 2020). Agri-food systems generate significant benefits for society, such as food, jobs and livelihoods for over a billion people. However, their negative impacts due to unsustainable activities and practices contribute to climate change, the degradation of natural resources and the impossibility of healthy diets (FAO, 2023). Furthermore, the main challenges facing food and agriculture tend to be soil degradation (Lal, 2015), which lowers agricultural productivity; water scarcity, due to urbanisation, agriculture intensification, and climate changes, with critical environmental and socioeconomic repercussions (Ingrao et al., 2023); climate change, which impacts crop yields and food security (Malhi et al., 2021); and the need for sustainable practices to meet the demands of the world's expanding population. The food and agricultural environment is further complicated by social issues like labor shortages and access to technology (Charlton & Kostandini, 2021), as well as economic considerations like shifting market prices and trade policies. To overcome these challenges, stakeholders must work together, come up with creative solutions, and be dedicated to sustainability.

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The issue of performance in food and agriculture companies targets complex aspects specific to both the performance topic and the particularities of the activity. In a sector where margins can be tight and competition is fierce (DeBoe, 2020), taking measures to streamline operations leading to increase financial performance ensure development resources. Businesses can assess their environmental impact and adopt sustainable strategies by understanding performance measures. As customers and authorities demand more environmentally responsible operations, achieving performance is more important. Moreover, the safety and satisfaction of consumers depend on the products that meet the quality requirements, ensured by performing activities. In addition, this can reduce waste and improve the company's overall reputation. Companies can better understand their place in the market, identify trends and adapt to changing customer preferences by evaluating performance and taking measures to improve it. Performance analysis helps companies control costs, optimize pricing strategy and improve profitability. By identifying research and development opportunities, continuous performance evaluation can promote innovation and lead to new products or improved procedures.

The purpose of this study is to address the impact of the implementation of sustainable principles in the practice of companies that generate food and agriculture revenue on financial performance. The research questions aim at: does sustainability performance have an impact on financial performance? Does addressing gender issues have a significant impact on financial performance? This study makes several contributions such as: it identifies the existing relationships between financial performance indicators and those of sustainability performance; it deepens the relationship at the level of the gender dimension; and specifies the correlation in the case of the company that generates FA Food and Agriculture. The results of the study are of interest for scholars, considering the contradictory results of previous research, for company managers in the field, in order to adopt optimal measures to improve financial performance in the context of ensuring sustainability performance, and for policymakers, in order to adopt measures to increase global performance, respectively sustainability performance and company profitability.

The structure of this study is as follows. The next section explores the literature that links financial performance to sustainability performance and gender issue. The methodology section presents the design of the model, the meaning of the indicators included in the model, the sample analyzed and the stages completed. The obtained results are discussed. Finally, the conclusions are formulated, the limits of the study are identified and future research directions are suggested.

Literature review

Research in the area has examined various aspects of both financial performance and its correlation with sustainability performance, with a particular focus on the agro-food sector. The sustainable approach at the agri-food system level aims at environmental sustainability, social sustainability, as well as economic sustainability.

The key financial indicators used to assess the performance of farms can be categorized as follows (Table 1): ratios for profitability, ratios for liquidity, ratios for financial efficiency, ratios for stability and solvency, and ratio for repayment capacity (Zorn et al., 2018):

Table 1. The financial indicators used to assess the performance of farms

Type	Indicators	Determination
Ratios for Profitability	net profitability	the farm net income divided by the sum of opportunity cost (the cost of equity)
	return on assets	the ratio between net income and farm assets
	return on equity	the ratio between net income and farm equity
	operating profit margin	the ratio between profit and farm's gross revenue
Ratios for Liquidity	working capital-gross revenues ratio	the ratio between working capital and business size measured by gross revenues
	cash flow ratio	the ratio between cash flow and turnover
	dynamic gearing ratio	the ratio between farm liabilities including short and long-term debts and cash flow
Ratios for Financial Efficiency	asset-turnover ratio	the ratio between farm turnover and total farm asset
	operating expense ratio	the share of operating expenses in farms' gross revenue
	the depreciation expense ratio	the share of depreciation in farms' gross revenue
	interest expense ratio	the share of farm interest expenses in the gross revenue
	net income from operations ratio	the net farm income to the gross revenue
Ratios for Stability and Solvency	fixed assets to total assets	the share of assets bound for a medium or long term
	equity to fixed assets ratio	the relation of farm equity and the fixed assets
	farm debt to equity ratio	the ratio between debt or borrowed capital (liabilities) and the equity
Ratio for Repayment Capacity	debt coverage ratio	the ratio between the farm term debt payments and cash flow

In researching the financial performance-sustainability performance relationship, most studies considered ROA and ROE as financial indicators, identifying contradictory relationships. Thus, sustainability performance influences positively, negatively or has no impact on financial performance (Friede et al., 2015; Chen et al., 2023). ROE indicates the company's ability to satisfy the requirements of all stakeholders, ensuring resources for capital remuneration, business development, increasing the quality of products/services, satisfying employee requirements, investing in environmental protection, and involvement in community issues. Financial performance can also be evaluated based on cash flow. In this approach, it was found that the increase in productive dimensions, especially the endowment with agricultural land and working capital, is essential to stimulate the cash-flow production of agriculture (Dono et al., 2021). In the case of high investment and high capital intensity agriculture firm, an adequate management mainly targets financial aspects such as the generation of cash flow to recover the invested capital and finance working capital and less economic ones. The existence of a gap between the economic and financial cycle generates financial deficits, causing farms to face difficulties in covering debt repayments (Iotti & Bonazzi, 2015).

In order to identify the effects that may further increase the vulnerability of the sector, Santarossa (2003) examined the factors that influence the long-term sustainability of the sector.

Financial indicators were modeled to assess the financial health of farms and to predict their future viability. In correlation, the technical efficiency of the farms and the possible sources of their inefficiency were analyzed. It was found that the farms most likely to survive were those that were not located in disadvantaged areas, were specialized, were large, and had low levels of indebtedness. On the other hand, farms with financial difficulties and technical inefficiency, specialized, survive especially when the debt ratio could ideally be reduced to zero, without making a significant attempt to diversify the agricultural enterprise.

With regard to organic agriculture, which, despite significant growth, still represents a negligible share of the world's agricultural area, opinions are divided, with some arguing that it is important for future global food security and others that it will become irrelevant. An analysis of the financial performance of organic agriculture compared to conventional agriculture shows that, although organic agriculture produces lower yields, it is significantly more profitable, has environmental benefits, and can make a greater contribution to sustainable world food production (Crowder & Reganold, 2015).

Agricultural sustainability aims at a holistic approach to the issues involved in making agriculture ecologically sound, economically viable and socially responsible around the world (Raman, 2024). The lack of systemic and transferable indicators that characterize agricultural and other eco-systems regarding all dimensions of sustainability, the lack of an adequate evaluation of agro-ecosystems, and the absence of principal guidelines for the formulation of management advice for practical application are the three main shortcomings that have been identified as limiting the transfer of the theoretical sustainability paradigm into agricultural practice (Von Wirén-Lehr, 2001).

The transformation of agro-food systems towards sustainability requires the involvement of all interested parties, by taking effective measures at the level of the entire value chain (Table 2).

Table 2. The decision-making factors in the transformation of agri-food systems towards sustainability

	business and financial institutions	**government**	**research and civil society organizations**
Agriculture supply chains	Public and private capital	Trade and market interventions Fiscal subsidies to producers Law and regulations	
Food consumption	Marketing and promotion	Fiscal subsidies to consumers Taxes on foods that constitute unhealthy and unsustainable diets Consumer purchasing power	Labelling and certificate
General service	Infrastructure expenditure		
	Research and development		
	Knowledge transfer services		
	Inspection services		

Source: author processing according to FAO 2023.

Agricultural policies influence the sustainability of the environment and the performance of the agricultural sector. The promotion of a shift in agricultural output towards the intensive margin, extensive margin, or entry-exit margin, and the dynamic consequences of land use choices are therefore the primary avenues for environmental impacts at the farm level. By encouraging (or discouraging) the provision of environmental services, regulations can also have an impact on agriculture's environmental performance. A number of variables influence how agricultural policies affect the environment: people different react to the financial incentives that agricultural policies provide, site-specific physical elements, such as terrain features, and the cumulative consequences of actions made over time (DeBoe, 2020).

A topic of interest in the literature, in the context of sustainable issue, is represented by the correlation between gender equality and performance in agriculture, revealing that there are strong links between gender, financial inclusion, and agricultural productivity (Atakli & Agbenyo, 2020). Furthermore, the firms with greater female representation on their boards have higher returns and lower levels of debt (Hernández & Nicolás, 2019).

These aspects provide the basis for the development of this empirical research to support previous results and provide new benchmarks in the field.

Methodology

In order to analyze how sustainability and gender equality influence the financial performance, indicators from each category were collected from Refinitiv Eikon database, considering as a benchmark of the selection FA Food and Agriculture indicator, representative for the study as it is a gauge of green revenue and sustainability at the same time. The analysis was conducted using a sample of 56 public companies from across the world and taking into consideration a period of 6 fiscal years (2019 - 2024). The companies were selected from 24 countries: Austria, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Indonesia, Ireland, Republic of Japan, Luxembourg, Malaysia, Mexico, Netherlands, Norway, Portugal, Singapore, Sweden, Switzerland, Turkey, United Kingdom and The United States of America.

The variables were divided into three categories: finance – return on equity (ROE), current ratio -, sustainability – ESG score and FA Food and Agriculture -, and gender equality – women employees score. The connection between these indicators was quantified and analyzed using EViews 12 statistical software.

When talking about performance, especially company’s performance, the best way to describe it is by looking at its financial results. In most of the cases, performance is evaluated by profitability and this aspect is given by a commonly used indicator named Return On Equity (ROE). ROE represents a profitability indicator calculated by dividing a company's net income by total equity of common shares. This ratio is in itself a performance standard, connecting the income statement to the balance sheet as the net income or profit is compared to the shareholders’ equity.

Alongside profitability, the business performance can be analyzed through its ability to pay off its short-term liabilities. Companies operate with assets in their activities and the easier it is to transform them into cash, the more liquidity they will achieve. Liquidity enables a business to ensure that its creditors are satisfied and gives way to resource acquisition for the activities performed. In the research, liquidity was measured by the current ratio, which measures a company’s ability to pay short-term obligations or those due within one year and it is determined as total current assets divided by total current liabilities. Depending on its level, the company can unlock a competitive advantage which in the long-term may lead to market penetration or pinpoint

a risk of financial distress, meaning that company's resources no longer cover the financial obligations.

Green economy is a global context engaging more and more countries and it became a fierce competition between the continents as Europe for example is striving be the first climate-neutral continent (European Commission). The green economy is supposed to raise awareness of climate change and environmental degradation as an existential threat to the entire world and was reflected in the study through the inclusion of green revenue and the ESG mindset. These two dimensions were reflected in some indicators such as: FA Food and Agriculture and the ESG score, which were provided by the companies in the sample over the last six years. Both indicators provide important insights into the sustainable economic development of the companies. FA Food and Agriculture refers to revenue generating activities from products that improve yield, productivity and sustainability in agriculture, silviculture, aquaculture and food production or distribution, whilst minimizing negative environmental impacts.

The ESG mindset can be regarded as the essence of sustainability as it stands for Environmental, Social, and Corporate Governance issues and represents a set of standards for how a company operates in regard to the planet and its people. Nowadays, ESG at company level became an important criterion for investors, as the dimension of this indicator tells if the business acts as a guardian of the planet by paying attention to the environmental concerns, being socially conscious and carefully and fairly managing its processes. ESG performance can be monitored through periodical reports, which informs the company if this indicator was consistently disclosed in a specific time frame. To ensure reliable ESG reports for internal and external users, different frameworks and standards are adopted by the companies.

The green economy which is worldwide desired to be achieved is also characterized by the idea of social inclusivity and gender equality, approaching in the research. In terms of social integration and equality which deals with the social dimension of ESG, gender equality was integrated in the research through the women employees score, which is the percentage of women employees to the total number of employees of the company. Gender equality is a topic of interest in the context of globalization and compliance with the Sustainable Development goals to achieve until 2030. The standard basically imposes countries to end all forms of discrimination and cease violence against women and girls and also eliminate care inequality and remuneration and guarantee equal development opportunities. At company level, sound policies can be defined to ensure women employees are respected and appreciated. Some ways to ensure the application of SDG5 within a company may include granting maternal leave and the chance to work with the company at the end of it, placing women in strategic positions within the organization and develop benefits and rewards plans for women based on their performance in the company.

The study has a quantitative approach, which is reflected in a panel data regression model based on the previously mentioned indicators. Representing a key measurement of financial performance, the return on equity was chosen as the dependent variable, FA Food and Agriculture, ESG score, women employees score were considered the independent variables, while current ratio is a control variable. The panel regression model was estimated based on the Ordinary Least Square method (OLS) and the dependent variable was normalized using the log function.

The influence of sustainability and gender equality on the performance of worldwide public companies was evaluated using a dated panel model which is expressed through the below equation:

$$y = a + bx_1 + cx_2 + dx_3 + ex_4 + \varepsilon \quad (1)$$

where:
y – dependent variable – ROE
x_1– independent variable – FA Food and Agriculture
x_2– independent variable – ESG Score
x_3– independent variable – Women Employees Score
x_4– control variable – Current Ratio
a, b, c, d, e – unknown parameters of the regression function
ε – error term (residue) – random variable

The statistical analysis was organized in stages as per below: i) deciding which estimation method should be applied to the model (fixed effects/random effects); ii) defining the model based on the preferred estimation method; iii) examining the results and decide if the independent variables are statistically significant and influence the studied phenomenon.

Results and discussions

In order to determine the estimation method, the Hausman test was performed to check the consistency between the fixed effects model and the random effects model.

Table 3. The Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.450663	4	0.0060

Source: Authors' own research based on EViews.

The Hausman test indicates a probability associated with the Chi-Square test of less than 5% (0.0060). As a result, the null hypothesis according to which the random-effects model is preferred over the fixed-effects model is rejected. Therefore, it is more appropriate to estimate the regression model by using The Least Squares method with fixed-effects corrections to panel data.

Strengthening the result of the Hausman Test, the redundant fixed effects test was applied to determine if the panel data model needs to be estimated based on fixed effects in order to analyse the relationship between the dependent variable and the independent variables.

Table 4. The Redundant Fixed Effects test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	7.027552	-55,271	0.0000
Cross-section Chi-square	297.813363	55	0.0000

Source: Authors' own research based on EViews.

The Redundant Fixed Effects Test is showing probabilities below 5% for the cross-section effects: Cross-section F and Cross-section Chi-square. Therefore, the null hypothesis upon which the individual effects are redundant is rejected and alternative hypothesis stating that the model should include individual effects is accepted.

Once the correct estimation method was established, the dated panel model could be estimated using fixed effected and The Least Squares approach.

Table 5. Results of the regression analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.	R-squared	Prob(F-statistic)	Durbin-Watson stat
c	-1.057394	0.435634	-2.427251	0.0159	0.635309	0.000000	1.622265
FA Food and Agriculture	-0.004679	0.006842	-0.683850	0.4947			
ESG Score	-0.014185	0.004929	-2.878055	0.0043			
Women Employees Score	-0.004864	0.004776	-1.018588	0.3093			
Current Ratio	0.154176	0.069190	2.228281	0.0267			

Source: Authors' own research based on EViews.

The model is characterized by a good result for the R-Squared test, meaning that this model explains 63.53% of the evolution of ROE, the dependent variable. Also, the relevancy of the model is proven by F-statistic indicator, having a probability of 0%, which is less than 5%.

As noticed in the regression model, only two factors were statistically significant with probabilities below 5 %, these being the ESG Score and the current ratio.

The literature offers perspectives on business performance, enhancing the fact that a company using solid ESG practices can obtain overall better results, financial performance being one of them (Nguyen et al., 2024). On the contrary, some researchers state that ESG performance may compromise the financial performance of the business, as the main profitability objectives became at risk of being neglected while focusing all the efforts on the integration of sustainability (Guo et al., 2024). Our study confirms the theory upon which serious investments in sustainability can diminish company's profitability, as the ESG score in the panel data model exerts a negative influence on the evolution of ROE in the given period. Moreover, studies comment on the main limitation of the ESG policies lying in their focus on financial risk detection, rather than on company's general performance. Adding to that, ESG practices may become a cost burden which may compromise company's performance as it involves resource consumption and conflicts with traditional theories and business models.

The implementation of ESG implies specific costs such as hiring experts capable to evaluate where the company stands and develop action plans, purchasing software that is compatible with the ESG tracking tools, training the employees to cultivate a mindset and culture which is centered on sustainability. Other costs may also include the adoption of sustainable policies in the workspace (recycling, placing plants in the offices, reducing water consumption, embracing renewable energy) and periodic controls such as audits and reports. As the financial efforts are considerable, other issues may also arise such as managers' tendency to divert the ESG allocated resources at the expense of shareholders' interest. (Lin et al., 2023).

Performance is also reflected in the level of productivity and some authors state that costs associated with ESG implementation are probable to outweigh the benefits, potentially hindering performance. Such costs may include labour, thereby affecting firm productivity through various operational and financial dimensions, indicating a negative correlation between ESG and business performance. (Arthur et al, 2025). Also, ESG scores are mostly to facilitate the comparison of companies with similar industries and geographical location. Overall, ESG appears to be an excellent way to incorporate sustainability as a driver of company's longevity and alignment to the global changes, but it is less effective when it comes to capturing sustainability in terms of the consequences and impacts on business (Clément et al., 2022).

Regarding the current ratio, the dated panel model shows a positive link between this indicator and the variation of ROE, accentuating that business performance is favourably influenced by a good level of assets liquidity. This hypothesis is validated by the existent literature, as high liquidity assures the creditors that the company has cash available at any moment, and also indicates the growth and maintenance on the market. Also, a strong liquidity management leads to a greater performance as risks are better controlled and the returns are increased (Quoc et al., 2024). Adding to that, liquidity is considered a measure of immediate solvency, meaning that assets have the ability to settle liabilities. Hence, if a company is illiquid, its financial balance is disturbed leading to instability and insolvency in the worst scenario (Štangová & Víghová, 2021). Farmers opt for high liquidity, which ensures flexibility, given that agriculture involves long cycles and pronounced seasonality.

The other 2 indicators, women employees score and FA Food and Agriculture were not described as relevant by the dated panel model while combined with the ESG Score and the current ratio. Even though, they were not perceived as statistically significant for the variation of ROE in this model, the business environment pays serious attention to green revenue and gender equality. Some studies state that the green revenue give way to the achievement of a more sustainable workflow and green innovation positively affects the financial performance (Huang et al., 2024). Also, the literature assesses that gender equality reflected in equal pay for men and women and the placement of women in the board of directors creates a reliable image for the interested parties which can increase the financial performance (Cavero-Rubio et al., 2019).

In contrast to many studies, highlighting the positivity of gender equality, researchers investigated the struggles of women in specific domains, agriculture being one of them. Therefore, it was discovered that women owners of farms have to cope with limited access to agricultural inputs such as land, capital, labour, and technology, and these circumstances lead to reduced productivity. Also, women strive to access financial services and products such as credit and insurance due to limited ownership of assets, restricted mobility, and social norms. Access to digital technologies is also hard to obtain, women being concentrated in the less profitable ends of the agriculture value supply chain and provided poor working conditions and low salaries. (Streimikis & Kyriakopoulos, 2024).

Conclusion

The aim of the study is to examine how financial performance is affected when businesses that produce food and agricultural products adopt sustainable practices. This research contributes in several of manners, such as identifying the existing relationships between financial performance indicators and those of sustainability performance in the case of the company that generates FA Food and Agriculture, and deepening the relationship at the gender dimension.

The analysis revealed a statistically significant negative relationship between ESG score and ROE. Also, an increasing liquidity rate ensures better financial profitability of companies. Conversely, there is no significant relationship between Women Employees Score and ROE, respectively between FA Food and Agriculture and ROE.

The study's findings will be valuable for scholars given the conflicting findings of previous studies, business managers in the industry to adopt the best practices for enhancing financial performance while ensuring sustainability performance, and policymakers to adopt strategies to boost sustainability performance and profitability.

The study investigated the financial performance evaluated exclusively on the basis of ROE, with the potential to be extended by considering additional indicators of financial performance. Furthermore, carrying out tests at the level of environmental, social and corporate governance components constitutes future research objective, which can highlight particular aspects in the relationship between financial performance and sustainability performance.

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