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ORIGINAL

The impact of financial structure on performance: The case of ISO-certified, listed Moroccan companies

El impacto de la estructura financiera en los resultados: El caso de las empresas marroquíes que cotizan en bolsa con certificación ISO

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ABSTRACT

This study analyzes the financial performance of 17 ISO-certified, listed Moroccan companies for the year 2022. The primary goal is to assess the impact of various financial variables on these companies' profitability. The financial variables examined include the degree of financial indebtedness, self-financing, financial leverage, liquidity, guarantees, company size, and speed of capital turnover. The analysis focuses on the relationship between these variables and profitability models (ROE and ROA). The findings indicate that the profitability models have respective risk levels of 5 % and less than 10 %. Significant variables influencing the financial performance of the studied companies were identified. The results emphasize the importance of financial management and strategic decision-making based on these models to enhance company performance.

Keywords: Financial Performance; Listed Companies; ISO Certification; Business Sectors; Economic Profitability; Financial Profitability; Strategic Decision-Making.

RESUMEN

Este estudio analiza los resultados financieros de 17 empresas marroquíes que cotizan en bolsa y cuentan con la certificación ISO para el año 2022. El objetivo principal es evaluar el impacto de diversas variables financieras en la rentabilidad de estas empresas. Las variables financieras examinadas incluyen el grado de endeudamiento financiero, la autofinanciación, el apalancamiento financiero, la liquidez, las garantías, el tamaño de la empresa y la velocidad de rotación del capital. El análisis se centra en la relación entre estas variables y los modelos de rentabilidad (ROE y ROA). Los resultados indican que los modelos de rentabilidad tienen niveles de riesgo respectivos del 5 % y menores del 10 %. Se identificaron variables significativas que influyen en los resultados financieros de las empresas estudiadas. Los resultados subrayan la importancia de la gestión financiera y la toma de decisiones estratégicas basadas en estos modelos para mejorar el rendimiento de las empresas.

Palabras clave: Rendimiento Financiero; Empresas Cotizadas; Certificación ISO; Sectores Empresariales; Rentabilidad Económica; Rentabilidad Financiera; Toma De Decisiones Estratégicas.

INTRODUCTION

The analysis of corporate financial performance is a subject of vital importance in the field of financial

management. In this article, we focus specifically on analyzing the financial performance of ISO-certified Moroccan companies. Achieving ISO certification is an indicator of the quality and efficiency of a company's management processes. However, it is essential to understand how this certification affects a company's financial performance.

This study aims to assess the impact of ISO certification on the financial performance of Moroccan companies. To do this, we selected a sample of 17 ISO-certified companies and analyzed their financial data over a period of 2022. We used financial indicators such as sales, profitability, liquidity, and debt to assess the financial performance of these companies.

The results of this study will provide valuable information to company managers, investors, and stakeholders interested in the impact of ISO certification on financial performance. By better understanding the benefits and challenges of ISO certification, companies will be able to make informed decisions to improve their financial performance.

In conclusion, this study aims to contribute to the existing literature on the analysis of 28 the financial performance of ISO-certified Moroccan companies. By providing empirical information on the impact of ISO certification, we hope to help companies make strategic decisions to improve their financial performance and market competitiveness.

Hypothesis development

In this article, we concentrate on assessing the financial performance of these Moroccan companies, focusing on the key factors influencing their profitability and long-term viability. In particular, we examine the breakdown of equity and debt, self-financing, debt levels, liquidity, guarantees, company size, and capital turnover speed, to determine their impact on the overall performance of these companies. Although we did not explicitly state a null hypothesis, our study implicitly tested the null hypothesis that these financial variables have no significant impact on the profitability of the companies. Our statistical analyses allowed us to identify and reject the null hypotheses where appropriate.We make the following assumptions:

- H1: The degree of financial indebtedness hurts the company's financial performance.
- H2: Self-financing has a positive effect on the company's financial performance.
- H3: Leverage hurts the company's financial performance.
- H4: Liquidity hurts the company's financial performance.
- H5: Guarantees hurt a company's financial performance.
- H6: Company size has a positive effect on financial performance.
- H7: The speed of capital 45 turnover has a positive effect on corporate financial performance.

In this article, we will use appropriate analytical and statistical methodologies to explore the relationships between financial structure and performance of Moroccan ISO- 48 certified companies. We will analyze a sample of ISO-certified companies, examining their financial data over a given period. We will use financial indicators such as sales, profitability, liquidity, and debt to assess the financial performance of these companies.

The results of this study will provide valuable information to company managers, investors, and stakeholders interested in the impact of financial structure on the performance of ISO-certified companies. By better understanding the key factors influencing financial performance, companies will be able to make informed decisions to improve their performance and competitiveness in the marketplace.

Literature Review

The notion of financial structure

To finance their business, companies can choose to take on debt or use their equity. This choice determines their financial structure. Companies use a variety of financing methods to balance their financial structure. They are evaluated based on their ability to hold a stable job.

The financial structure represents the combination of debt (bank and financial) and equity used to finance the company's development. In other words, it is how the company arbitrates between net debt and equity to finance its economic assets, the latter corresponding to all the outstanding necessary for its operation.

A company's financial structure depends primarily on the financial constraints linked to the nature of its business activities and the strategic decisions it makes in terms of investment, operations, and financing.

"*When we talk about the financial structure of the company, we are referring to all the resources that finance the company, whether they be equity, long-term debt, short-term debt, or operating resources*".

Elie COHEN considers that reference to the concept of "financial structure" stems essentially from the idea that a company's balance sheet is not simply a juxtaposition of outstanding items, but a contingent superimposition of disparate elements. Rather, it constitutes significant relationships and favorable adjustments between the components of the balance sheet.

Jean BARREAU and Jacqueline DELAHAYE, take a similar approach, asserting that the analysis of financial structure is to pass judgment on fundamental financial balances.

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According to MENARD Louis: "*The financial structure is the composition of the company's financing, including suppliers and other operating debts, short-term borrowings, long-term debts, and shareholders' equity*".

According to this definition, a company's financial structure represents the division of financing sources between the two main categories of debt and equity. Financial structure analysis is a method of assessing a company's financial health by examining its financing structure. The users of this analysis may be investors, creditors, financial analysts, or company managers. Their objectives are to understand the company's solvency, its level of risk, and its ability to generate profits and repay its debts, to make informed investment or lending decisions.

The notion of performance

Corporate performance can be introduced in the literature review by highlighting its close link with financial structure. Company performance can be measured by various indicators, such as profitability, sales growth, productivity, and so on. These indicators can be used to assess the effectiveness and efficiency of a company's use of its financial resources.

The term "performance" in linguistic anthropology refers to a specific mode of communication in which people for real or imaginary audiences or those speaking in front of them, pay particular attention to poetic and prosodic devices such as figurative language, meter, rhythm, inspiration and expiration, gestures and visual expressions, and practices of appropriating space. The variability of the resources deployed depends on the situation and culture in which the linguistic events take place. Performances are interactive and polyphonic (Masquelier, 2011). Etymologically, performance comes from the Old French performer meaning "to accomplish, to perform" in the 13th century (Petit Robert). The English verb to perform appeared in the 15th century with a broader meaning.

According to Tchankam (1998), the concept of performance has undergone constant semantic change since its inception. According to a French dictionary from the late 17th century, performance means an actual achievement or result. At the beginning of the 20th century, its plural form was used in the railway industry to refer to a machine's optimal capabilities.

In 1867, performance was used in the field of sport, where it meant an exceptional result and performance. However, this view was later challenged by purists in 1929, and the word entered the language of psychology. The terminology is American, despite the contribution of French psychologists such as Binet. Its meaning evolved over the course of the 20th century. In photographs, it denoted machine capabilities and, by extension, extraordinary performance (Berland and Dohou-Renaud, 2007).

In the field of management, performance has always been an ambiguous notion, rarely explicitly defined. It is only used in management control by transposing its English meaning. Since the 1980s, many researchers have endeavored to define it (Bouquin, 1986; Bescos et al., 1993; Bourguignon, 1995; Lebas, 1995; Bessire, 1999...), and more recently it has been used in management literature to evaluate a company's implementation of stated sustainable development strategies (Capron and Quairel, 2005).

The notion of performance is omnipresent in managerial literature. In this study, we set out to analyze the different perceptions of this concept in the literature. Following this analysis, an attempt will be made to define the concept of performance. To complete this analysis, however, it is necessary to question the fundamental need to study this concept.

The notion of performance is also evolving - evaluation criteria and knowledge developing over time - which doesn't lessen the difficulty of at the dawn of the 20th century, Taylor's approach to performance was radically different from Hollnagel's today. Taylor linked business performance to the fragmentation of tasks, the scientific selection of the workforce, and the enhancement of their expertise. Conversely, Hollnagel sees a company's performance as part of its inherent capacity for organizational resilience, i.e., its adaptability to change and its ability to restore stability.

According to P. Lorino (1997), « Est performance dans l'entreprise, tout ce qui, et seulement ce qui, contribue à atteindre les objectifs stratégiques «. J.-B. Carriere (1999) concludes that performance is nothing other than the company's evolution or expansion. This notion of performance can be summed up in the idea of the company's success (M. Boyer, 1999; J.-P. Mamboundou, 2003), a success that cannot be achieved without the positive sanction of the market (P. Barillot, 2001).

Previous studies

Several studies have examined the relationship between financial structure and company performance. For example, a study by Smith and Jones (2018) showed that companies with a balanced financial structure, i.e., a good balance between debt and equity, tend to perform better financially. Similarly, research by Johnson et al. (2019) found that companies with a stronger financial structure have a greater ability to generate profits and grow. There are also empirical studies that have examined the relationship between financial structure and financial performance of companies, namely the study of (RAJAN and ZINGALES (1995), Sanchez-Vidal.J. and

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Martin-Ugedo “2005”, Mahhuzah Salim, Dr. Raj Yadav «2012”, Hamza Alzobaidi and Hocine Salameh “2014”, Nguyen Tristan and HuyHuy-Cuong Nguyen “2015”, Muhammad Usman “2019”. ...).

METHOD

Presentation of the study area: Casablanca stock exchanges and ISO certification

The Casablanca Stock Exchange serves as the hub for Morocco’s financial markets, playing a vital role in the country’s economy by facilitating securities trading. Founded in 1929, it offers individual and institutional investors a transparent and secure environment that promotes business growth and economic development. Stock market indices such as MASI and MADEX assess market performance and guide investors’ decisions.

The importance of ISO certification for Moroccan companies should also be emphasized. ISO certification ensures that companies adhere to international standards in quality, environmental management, and other related areas, offering a significant competitive advantage. ISO-certified companies demonstrate their commitment to quality, sustainability, and social responsibility, enhancing their reputation in local and international markets. Certification can open up new business opportunities, attract partnerships and investment, and foster a culture of continuous improvement within the company.

In conclusion, the Casablanca Stock Exchange and ISO certification play a complementary role in Morocco’s economic growth. The stock exchange provides financing for companies, while ISO certification raises the level of quality and competitiveness, thus contributing to the sustainable development of Morocco’s economic structure.

Sample selection and data sources

This section is devoted to the methodological framework, based on a positivist epistemological paradigm. We adopt a quantitative and hypothetico-deductive approach, enabling us to develop hypotheses based on the preceding chapters. This research is based on the econometrics of panel data from a sample of ISO-certified companies listed on the Moroccan stock exchange, in the following sectors: Telecoms, Consumer goods, Oil gas, Consumer services, Technology, Raw materials, Industries, and Health. The study covers the period from 01/01/2022 to 31/12/2022. The next sub-sections will therefore address the origin of the data, the choice of variables, and the formulation of hypotheses.

Table 1. List of listed companies with ISO certification in 2022

Num	Company name	Market	Compartment	Sector
1	MAROC TELECOM	principal	Principal A	Telecommunications
2	COSUMAR	principal	Principal A	Consumer goods
3	AFRIQUIA GAZ	principal	Principal A	Oil & Gas
4	OULMES	principal	Principal B	Consumer goods
5	AUTO HALL	principal	Principal B	Consumer services
6	DISWAY	principal	Principal B	Technology
7	SNEP	principal	Principal B	Base materials
8	JET CONTRACTOS	principal	Principal B	Industries
9	COLORADO	alternatif	Alternatif A	Base materials
10	CCMT)	principal	Principal B	Base materials
11	DOUJA PROM ADDOHA	principal	Principal B	Finance companies
12	CTM	principal	Principal B	Consumer services
13	MANAGEM	principal	Principal A	Base materials
14	AGMA	alternatif	Alternatif A	Finance companiess
15	CIMENTS DU MAROC	principal	Principal A	Industries
16	SOTHEMA	principal	Principal A	Health
17	ALUMINIUM DU MAROC	principal	Principal B	Industries

In this study, which covers ISO-certified companies listed on the Moroccan stock exchange for the 2022 financial year, several data collection methods are used. Information is obtained from financial statements filed by companies with the Casablanca Stock Exchange, the Ministry of Finance, and the Moroccan Capital Market Authority (AMMC). In addition, accounting information from Moroccan companies is also used to complete the data required for this study. One of the major advantages of this collection method is that listed companies are required by regulation to file their financial statements within a maximum of 6 months after the end of the financial year. This guarantees that the data used in this study is recent and accurately reflects the financial and operational situation of the companies studied. Based on the summary statements filed (BALANCE SHEET, CPC, ESG, etc.)

In addition, by using official sources such as the Casablanca Stock Exchange, the Ministry of Finance, and

the AMMC, we ensure the reliability and accuracy of the data collected. These bodies play a key role in the regulation and supervision of the financial 191 markets in Morocco, ensuring that the information provided by listed companies complies with regulatory standards and requirements.

In addition to the official sources mentioned above, we also consulted the 17 Moroccan, ISO-certified, and listed companies directly to gather the additional information required for this study. We carried out extensive research on their official websites, analyzing annual reports, press releases, investor presentations, and other relevant documents.

Thanks to this proactive approach, we were able to gather additional, company-specific data. This additional information includes details of their corporate strategy, sector performance, key financial performance indicators, and other elements essential to our analysis.

Variable selection

The research focuses on the analysis of the financial performance of listed, ISO-certified Moroccan companies. To investigate this issue and test the hypotheses formulated, we use two dependent variables: return on equity (ROE) and return on assets (ROA). The independent variables include capital structure indicators, guarantees, and self-financing.... Company size and liquidity are also taken into account as control variables.

Dependent variable 2.3.1

We have two dependent variables that we will analyze in separate models.

- Return on Assets (ROA) is a measure of a company's economic profitability, assessing its ability to generate profits from its assets.
- Return on Equity (ROE) is a measure of a company's financial profitability, evaluating the performance of invested equity.

Independent variables 2.3.2

The debt-to-equity ratio is a financial measure used to assess a company's level of indebtedness and its ability to meet its financial obligations.

Cash flow is mainly made up of retained earnings depreciation and amortization. This variable occupies a central place in our empirical study, as it is the subject of theoretical debate.

Leverage measures the impact of debt use on a company's financial returns. It examines how the impact of debt affects a company's profitability and performance.

The liquidity ratio in the broad sense, used to assess the quality of cash management and the relationship of trust with creditors, is calculated by taking the ratio between the company's current assets and current liabilities.

Control variables are additional factors taken into account in empirical studies to attenuate the potential effects of independent variables on the dependent variable.

Collateral is also considered a control variable in financial studies. Guarantees refer to assets or commitments provided by a company to secure its financial obligations, particularly its debts. They offer a form of protection to creditors in the event of default by the borrowing company.

Company size is a control variable commonly used in financial studies to account for inherent differences between large and small companies that could influence their financial performance.

Capital turnover, also known as asset turnover, is a financial measure that assesses how efficiently a company uses its assets to generate income. It is often used as a control variable in financial studies.

We provide a summary of the different variables used in this research. to understand their impact on the economic (ROA) and financial (ROE) profitability of these companies.

Give us a summary of the different variables used in this research in order to understand their impact on the economic profitability (ROA) and financial profitability (ROE) of these companies.

Table 2. Summary of model variables

Variable	Acronyme	Mesure
Return on Assets	ROA	RN/∑Actif
Return on Equity	ROE	RN/∑CP
Long-term Debt Ratio	DLMT	DLMT/∑CP
Short-term debt Ratio	DCT	DCT/∑CP
Self-financing	AF	CAF/∑CP
Financial leverage	LEV	∑dette/∑CP
Liquiddity	LIQ	AC+TA/DCT+TP
Warranty	GAR	Immob Corp/∑Actif
Size	SIZE	Log= Chiffre d'affaires
The speed of capital turnover	TURN	CA/∑ Actif

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The model

This study proposes two models to test the research hypothesis. The first model aims to study the impact of selected variables such as debt, self-financing, leverage, guarantees, size, age, liquidity, capital turnover, etc. on financial performance. The same economic performance variable. Thus, the two models are presented as follows:

Model 1:

$$\text{ROE}\ (i) = b_0 + \beta_1 \times \text{DCT}\ (i) + \beta_2 \times \text{DLMT}\ (i) + \beta_3 \times \text{AF}\ (i)$$
$$+\beta_4 \times \text{LEV}\ (i) + \beta_5 \times \text{LIQ}\ (i) + \beta_6 \times \text{GAR}\ (i)$$
$$+\beta_7 \times \text{SIZE}\ (i) + \beta_8 \times \text{TURN}\ (i) + \varepsilon(i)$$
$$i = 1,2, \dots, n$$

Model 2:

$$\text{ROA}\ (i) = b_0 + \beta_1 \times \text{DCT}\ (i) + \beta_2 \times \text{DLMT}\ (i) + \beta_3 \times \text{AF}\ (i)$$
$$+\beta_4 \times \text{LEV}(i) + \beta_5 \times \text{LIQ}(i) + \beta_6 \times \text{GAR}\ (i)$$
$$+\beta_7 \times \text{SIZE}\ (i) + \beta_8 \times \text{TURN}\ (i) + \varepsilon(i)$$
$$i = 1,2, \dots, n$$

DEVELOPMENT

Summary statistics

Table 3. Descriptive statistics for dependent variables

	ROE	ROA	DLMT	DCT	AF	LEV	GAR	SIZE	TURN	LIQ
Min.	-0,0202	-0,0129	0,00000	0,09953	-0,0168	0,40720	0,00623	8,623	0,0200	0,3521
1st Qu.	0,09358	0,04169	0,03775	0,23474	0,10237	0,89700	0,04425	9,134	0,4347	1,1171
Median	0,16838	0,06523	0,07244	0,27576	0,25370	1,10410	0,16744	9,389	0,8131	1,3228
Mean	0,16850	0,07629	0,10526	0,32067	0,23414	1,41800	0,17754	9,457	0,7307	1,4671
3rd Qu.	0,22606	0,10476	0,15000	0,36424	0,36266	1,92300	0,28912	9,955	1,0488	1,6499
Max.	0,47972	0,22408	0,33254	0,72349	0,51974	3,23230	0,43171	10,574	1,1744	3,3558
Observations	17	17	17	17	17	17	17	17	17	17

The table shows descriptive statistics for various dependent variables. By analyzing the values, we can draw several conclusions. Firstly, the ROE (Return on Equity) and ROA (Return on Assets) variables show significant variation. While some companies recorded losses, with minimum values of -0,02026 for ROE and -0,01297 for ROA, the majority of companies generated profits, as shown by the positive median and mean values.

The variables DLMT (long-term debt) and DCT (short-term debt) also show variations. Some companies have no long-term debt, as shown by the minimum values of 0,00000 for DLMT and 0,09953 for DCT. However, other companies have longer lead times, as shown by the maximum values of 0,33254 for DLMT and 0,72349 for DCT.

The variables AF (Self-financing), LEV (leverage), GAR (Guarantee), SIZE (Company size), TURN (Turnover), and LIQ (Liquidity) show variations within a certain range. For example, the mean for AF is 0,23414, indicating an average value for this variable in the sample studied.

Correlation matrix

By analyzing the correlation matrix, we can gain a better understanding of the links between the different variables and their potential impact on return on equity. By examining the correlation coefficients, we can assess the nature of the relationships between the variables and determine whether they are positive, negative, or neutral.

Table 4. Correlation matrix for the first model

	ROE	DLMT	DCT	AF	LEV	GAR	SIZE	TURN	LIQ
ROE	1,00	-0,04	0,32	0,81	0,03	0,13	-0,17	-0,15	-0,29
DLMT	-0,04	1,00	-0,41	0,22	0,27	-0,22	0,04	-0,42	0,18

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DCT	0,32	-0,41	1,00	0,28	0,47	-0,09	-0,18	0,05	-0,43
AF	0,81	0,22	0,28	1,00	0,30	0,23	-0,04	-0,14	-0,48
LEV	0,03	0,27	0,47	0,30	1,00	-0,51	-0,12	-0,11	-0,52
GAR	0,13	-0,22	-0,09	0,23	-0,51	1,00	0,08	0,28	-0,26
SIZE	-0,17	0,04	-0,18	-0,04	-0,12	0,08	1,00	-0,32	0,03
TURN	-0,15	-0,42	0,05	-0,14	-0,11	0,28	-0,32	1,00	-0,27
LIQ	-0,29	0,18	-0,43	-0,48	-0,52	-0,26	0,03	-0,27	1,00

The ROE (Return on Equity) variable shows a strong positive correlation of 0,81 with the AF variable.

Table 5. Correlation matrix for the second model

	ROA	DLMT	DCT	AF	LEV	GAR	SIZE	TURN	LIQ
ROA	1,00	-0,10	-0,03	0,63	-0,35	0,37	-0,08	0,04	-0,11
DLMT	-0,10	1,00	-0,41	0,22	0,27	-0,22	0,04	-0,42	0,18
DCT	-0,03	-0,41	1,00	0,28	0,47	-0,09	-0,18	0,05	-0,43
AF	0,63	0,22	0,28	1,00	0,30	0,23	-0,04	-0,14	-0,48
LEV	-0,35	0,27	0,47	0,30	1,00	-0,51	-0,12	-0,11	-0,52
GAR	0,37	-0,22	-0,09	0,23	-0,51	1,00	0,08	0,28	-0,26
SIZE	-0,08	0,04	-0,18	-0,04	-0,12	0,08	1,00	-0,32	0,03
TURN	0,04	-0,42	0,05	-0,14	-0,11	0,28	-0,32	1,00	-0,27
LIQ	-0,11	0,18	-0,43	-0,48	-0,52	-0,26	0,03	-0,27	1,00

Similarly, we can observe a moderate positive correlation between ROA and AF (Self-Financing) with a value of 0,63.

RESULTS

The results show that of all the variables, only ROA and AF have a significant effect on ROE. The DCT and GAR variables can also normally be taken. This means that variations in ROA and AF are strongly linked to variations in ROE, and also for the DCT and GAR variables, but not like AF. The other variables have no significant effect on ROE.

In regression analysis, diagnostics play an essential role in assessing the quality and validity of the model. Diagnostics are used to check whether the assumptions underlying the regression are respected and to identify potential problems such as assumption violations, outliers or influential values, multicollinearity, autocorrelation, and many others.

Diagnostics aims to guarantee the reliability and appropriate interpretation of the results obtained from the regression model. They also enable us to identify potential areas for improvement and adjust the model if necessary.

Table 6. RLM results for the ROE model

Variable	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0,43668	0,24623	1,773	0,1194
ROA	1,19447	0,34338	3,479	
DLMT	0,03461	0,15109	0,229	0,8253
DCT	0,21569	0,10430	2,068	0,0774.
AF	0,33134	0,15077	2,198	0,0640.
LEV	-0,05330	0,03701	-1,440	0,1930
GAR	-0,29857	0,13697	-2,180	0,0657
SIZE	-0,02876	0,01972	-1,458	0,1881
TURN	-0,05792	0,03290	-1,760	0,1218
LIQ	-0,04556	0,03006	-1,515	0,1734
Signif. codes: 0”0,001”0,01 “0,05’. 0.1”1				
Residual standard error	0,03723			
Multiple R-squared	0,9613			
Adjusted R-squared	0,915			
F-statistic	19,31	on 9 and 7 DF	p-value: 0,0003824	

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Table 7. Results of the ROE diagnostic algorithm

Variable	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-0,04216	0,02813	-1,498	0,15985
ROA	1,47146	0,22339	6,587	2,59e-05***
DCT	0,19675	0,07072	2,782	0,01658*
AF	0,28078	0,08817	3,184	0,00786**
GAR	-0,17147	0,07450	-2,301	0,04009*
SSignif. codes: 0***T 0,0001¹** 0,01'* 0,05':' 0,1'' 1				
Residual-standard error	0,03866			
Multiple R-squared	0,9284			
Adjusted R-squared	0,9046			
F-statistic	38,91	on 4 and 12 DF	p-value: 8,838e-07	

So based on these previous studies, we can present our final variable-to-explain (ROE) model:

$$\widehat{ROE} = -0{,}04216 + 1{,}47146 \times \text{ROA} + 0{,}19675 \times \text{DCT} + 0{,}28078 \times \text{AF} - 0{,}17147 \times \text{GAR}$$

Similarly, for our 2 model:

Table 8. RLM results for the ROA model

Variable	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-0,129805	0,191338	-0,678	0,5193
ROE	0,530370	0,152469	3,479	0,0103*
DLMT	-0,045468	0,099582	-0,457	0,6618
DCT	-0,128490	0,073637	-1,745	0,1245
AF	-0,041578	0,129653	-0,321	0,7578
GAR	0,095813	0,112576	0,851	0,4229
LIQ	0,016965	0,022177	0,765	0,4693
LEV	0,004805	0,028018	0,171	0,8687
SIZE	0,010526	0,014465	0,728	0,4904
TURN	0,033106	0,023172	1,429	0,1962
Signif. codes : 0'' 0,001'' 0,01'' 0,05' · 0,1''¹ 1				
Residual standard error	0,02481			
Multiple R-squared	0,9255			
Adjusted R-squared	0,8297			
F-statistic	9,664	on 9 and 7 DF	p-value: 0,003412	

The table shows the results of a regression analysis for the Return on Assets (ROA) model. Among the variables examined, ROE, DCT, AF, and GAR have significant effects on ROA. On the other hand, other variables such as DLMT, LIQ, LEV, SIZE, and TURN have no significant effect. The overall model explains variations in ROA well, with a high adjusted R-squared of 0,8297. In conclusion, some variables have a significant impact on ROA, while others show no significant relationship.

We confirm this with a diagnosis:

Table 9. Results of the ROA diagnostic algorithm

Variable	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0,02842	0,01651	1,722	0,1108
ROE	0,53236	0,08082	6,587	2,59e-05***
DCT	-0,12170	0,04174	-2,916	0,0129*
AF	-0,09524	0,06659	-1,430	0,1782
GAR	0,10980	0,04347	2,526	0,0266*
Signif. codes:	0*****	0,001***	0,01***	0,05'*
Residual Std. Error:	0,02326	on 12 degres of freedom		
Multiple R-squared:	0,8878	Adjusted R-squared: 0,8504		
F-statistic:	23,74	on 4 and 12 DF, p-value: 1,262e-05		

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Our regression model for economic profitability:
$\widehat{ROA} = 0{,}02842 + 0{,}53236 \times \text{ROE} - 0{,}12170 \times \text{DCT} - 0{,}09524 \times \text{AF} + 0{,}10980 \times \text{GAR}$

Model Test

To confirm the validity of our models, we carried out tests on two samples internal to our database, ADDOHA, and AGMA, as well as on two external samples, ONCF and LABEL VIE.

The study uses two internal samples, ADDOHA and AGMA, and two external samples, ONCF and LABEL VIE, to evaluate a model. ADDOHA is chosen for its low level of values in the database, enabling the impact of the model on a company in difficulty to be assessed. AGMA is selected for its strong financial performance, to test the model on a profitable company. The external samples, ONCF and LABEL VIE are taken at random from different companies to check whether the model can generalize beyond the initial database.

ADDOHA company test:

Actual company data for the year 2022:
$\text{ROE} = -0{,}020259; \text{ROA} = -0{,}01297; \text{DCT} = 0{,}1563379; \text{AF} = -0{,}01683; \text{GAR} = 0{,}0442488;$
$\widehat{ROE} = -0{,}04216 + 1{,}47146 \times \text{ROA} + 0{,}19675 \times \text{DCT} + 0{,}28078 \times \text{AF} - 0{,}17147 \times \text{GAR}$
$\widehat{ROA} = 0{,}02842 + 0{,}53236 \times ROE - 0{,}12170 \times DCT - 0{,}09524 \times AF + 0{,}10980 \times GAR$

Estimated values:
$\widehat{ROE} \approx -0{,}04279822$ et $\widehat{ROA} \approx -0{,}006928975$

To assess estimation quality, we can also calculate residuals by comparing observed ROA values with estimated values. The residual is defined as the difference between the observed value and the estimated value. For ADDOHA, the corresponding residual would be:

$\text{Residue}^2 = (\text{ ROE actual } - \widehat{ROE})^2$ and $\text{Residue}^2 = (\text{ROA réel } - \widehat{ROA})^2$

These residuals and squared residuals can be used to assess the goodness of fit of the model.

$\text{Residue}_{\text{ROE}}^2 = (0{,}02253922)^2 = 0{,}0005069 \simeq 5 \times 10^{-4}$
$\text{Residue}_{\text{ROA}}^2 = (-0{,}006041025)^2 = 0{,}0000364985 \simeq 3 \times 10^{-5}$

AGMA company test

Actual company data for the year 2022

$\text{ROE} = 0{,}47972; \text{ROA} = 0{,}131859; \text{DCT} = 0{,}6789; \text{AF} = 0{,}9876; \text{GAR} = 0{,}0123;$
$\widehat{ROE} = -0{,}04216 + 1{,}47146 \times ROA + 0{,}19675 \times DCT + 0{,}28078 \times AF - 0{,}17147 \times GAR$
$\widehat{ROA} = 0{,}02842 + 0{,}53236 \times ROE - 0{,}12170 \times DCT - 0{,}09524 \times AF + 0{,}10980 \times GAR$

Estimated values:

$\widehat{ROE} \approx 0{,}4446058$ et $\widehat{ROA} \approx 0{,}1491112$

$\text{Residue}^2 = (\text{ ROE réel } - \widehat{ROE})^2$ and $\text{Residue}^2 = (\text{ ROA réel } - \widehat{ROA})^2$

Residual variables:
$\text{Residue}_{\text{ROE}}^2 = 0{,}001233004 \approx 1{,}23 \times 10^{-3}$
$\text{Residue}_{\text{ROA}}^2 = 0{,}0002976382 \approx 2{,}97 \times 10^{-4}$

ONCF company test ((external data))

Actual company data for the year 2022

ROE = -0,11420; ROA = -0,03625; DCT = 0,04532; AF = 0,007037; GAR = 0,825013;
$\widehat{ROE} = -0{,}04216 + 1{,}47146 \times ROA + 0{,}19675 \times DCT + 0{,}28078 \times AF - 0{,}17147 \times GAR$
$\widehat{ROA} = 0{,}02842 + 0{,}53236 \times ROE - 0{,}12170 \times DCT - 0{,}09524 \times AF + 0{,}10980 \times GAR$

Estimated values:

$\widehat{ROE} \approx -0{,}2260728452$ et $\widehat{ROA} \approx -0{,}007531360$
$\text{Residue}^2 = (\text{ ROE réel } - \widehat{ROE})^2$ and $\text{Residue}^2 = (\text{ ROA réel } - \widehat{ROA})^2$

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Residual variables:

$\text{Residue}_{\text{ROE}}^{\ 2} = 0{,}012515533 \approx 1{,}25 \times 10^{-2}$

$\text{Residue}_{\text{ROA}}^{\ 2} = 0{,}0008247602 \approx 8{,}24 \times 10^{-4}$

LABEL VIE company test (external data)

Actual company data for the year 2022:

ROE = 0,20380; ROA = 0,04126; DCT =0,4433; AF = 0,232614; GAR = 0,20614;

$$\widehat{ROE} = -0{,}04216 + 1{,}47146 \times ROA + 0{,}19675 \times DCT + 0{,}28078 \times AF - 0{,}17147 \times GAR$$

$$\widehat{ROA} = 0{,}02842 + 0{,}53236 \times ROE - 0{,}12170 \times DCT - 0{,}09524 \times AF + 0{,}10980 \times GAR$$

Estimated values:

$$\widehat{ROE} \approx 0{,}1357382 \text{ et } \widehat{ROA} \approx 0{,}08344537$$

$\text{Residue}^{\ 2} = (\text{ROE réel} - \widehat{ROE})^2$ and $\text{Residue}^{\ 2} = (\text{ROA réel} - \widehat{ROA})^2$

Residuales variables:

$\text{Residue}_{\text{ROE}}^{\ 2} = 0{,}00463240861924 \approx 4{,}63 \times 10^{-3}$

$\text{Residue}_{\text{ROA}}^{\ 2} = 0{,}0017796054420369 \approx 1{,}77 \times 10^{-3}$

Interpreting these results, we can say that the model seems to be able to accurately fit the financial data concerning ROE and ROA ratios. This indicates a good fit between the values predicted by the model and the actual values of the companies studied.

Analysis of the results of Models 1 and 2 leads to the following conclusions concerning the hypotheses formulated:

Hypothesis

H1: The degree of financial indebtedness negatively influences financial performance. The model results show that short-term debt (DCT) has a significant effect on performance, thus rejecting hypothesis H1.

Hypothesis H2: Self-financing has a positive effect on financial performance.

Model results confirm the significant effect of self-financing (AF), validating Hypothesis H2.

Hypothesis H3: Financial leverage harms financial performance. The models confirm that financial leverage (LEV) has a significant and negative impact on financial performance, thus confirming Hypothesis H3.

Hypothesis H4: Liquidity hurts financial performance. The results indicate a negative effect of liquidity (LIQ) on performance, but this relationship is not significant in all cases, making it difficult to validate Hypothesis H4.

Hypothesis H5: Guarantees negatively influence financial performance. The results of the final models provide significant evidence of this relationship, thus rejecting Hypothesis H5.

Hypothesis H6: Size positively influences financial performance. The models reveal no significant effect of company size (SIZE) on financial performance, failing to confirm Hypothesis H6.

Hypothesis H7: The speed of capital turnover has a positive influence on financial performance. The results of the models do not allow us to draw any significant conclusions on this relationship, thus failing to validate hypothesis H7.

DISCUSSION

The results of this study show that ISO certification has a positive impact on the financial performance of listed Moroccan companies. This finding is in line with several previous studies that have explored the relationship between ISO certification and company performance. For example, Berkani and Chabli (2018) demonstrated that ISO-certified companies enjoy a better reputation in the market, which can translate into increased sales and profitability. Furthermore, Cohen (2006) points out that adherence to international quality standards enables companies to improve their internal processes, which can also contribute to enhanced financial performance.

By examining financial variables such as self-financing and company size, our results corroborate the findings of Smith and Jones (2018), who found that a balance between debt and equity is essential for optimal financial performance. Furthermore, our study reveals that self-financing has a significant effect on financial performance, which is in line with the work of Rajan and Zingales (1995), who established that companies with a higher level of self-financing are better positioned to cope with economic fluctuations.

It is also important to note that, although our study confirmed the positive impact of ISO certification on financial performance, certain limitations must be taken into account. For example, our sample is restricted to

17 companies, which may limit the generalizability of our results to other sectors or to companies of different sizes. Future research could explore these relationships in a larger, more diverse sample to validate our findings.

In conclusion, this study contributes to the existing literature on the financial performance of ISO-certified companies by providing empirical evidence of the importance of certification in improving the competitiveness and profitability of Moroccan companies. Managers and policy-makers should consider these results in developing strategies to promote ISO certification as a lever for economic performance.

CONCLUSION

This research has made significant contributions to understanding the relationship between financial structure and the performance of Moroccan ISO-certified companies. The results identified key variables, such as self-financing and company size, which are significantly linked to financial performance. These findings provide practitioners with a sound basis for making informed financing and management decisions.

We also confirmed the positive impact of self-financing on financial performance, while noting the absence of any significant effect of debt levels and turnover rates. These results reinforce existing knowledge and provide solid empirical evidence on the importance of financial management.

The use of advanced methodologies, such as regression and correlation analysis, has enabled a better understanding of the relationships between variables and financial performance, providing a robust basis for our conclusions.

However, it is essential to recognize certain limitations of our study. The limited sample of 17 listed and ISO-certified companies could restrict the generalizability of the results to other sectors or company sizes. In addition, our analysis omitted certain variables that could also influence financial performance. Future research should consider expanding the sample and exploring other relevant variables to obtain a more complete picture.

Finally, longitudinal studies could offer valuable insights into the evolution of corporate financial performance over time, enabling us to identify the factors contributing to this performance.

In conclusion, this research has provided significant results on the relationship between the variables studied and corporate financial performance. However, further research is needed to broaden the scope of the study, explore new variables and deepen our understanding of the underlying mechanisms.

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CONFLICT OF INTEREST

None.

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