INFLUENCE OF FINANCIAL FACTORS ON THE OUTCOMES OF ACCREDITATION PROCESSES IN CHILEAN UNIVERSITIES

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SUMMARY

Institutional accreditation processes are a strategic element for the sustainability of universities, as they help validate their operations, ensure student access, and facilitate the acquisition of financial resources. Various factors influence the success of these processes, including financial variables. The main objective of this study was to analyze the influence of financial variables on the achievement of a greater number of institutional accreditation years in Chilean universities, highlighting the relevance of the operating margin and total assets. Based on the analysis of a sample of 53 higher education institutions in 2023, an ordinary least squares (OLS) regression model was employed, which revealed the importance of the operating margin and total assets in accreditation outcomes. The study concludes that strong and efficient financial management exerts a positive impact on achieving a higher number of institutional accreditation years.

Introduction

In recent decades, institutional accreditation processes have acquired strategic relevance in shaping and sustaining higher education systems, becoming key mechanisms for validating the overall quality of universities, facilitating access to public funding, and ensuring the trust of various stakeholders (Peterson and Augustine, 2000; Motova and Pykkö, 2012; Barroilhet *et al*., 2021; Valdez and Ganga-Contreras, 2021; Burgos *et al*., 2022; Cheng *et al*., 2022; Ganga-Contreras *et al*., 2023; Awa *et al*., 2024). Particularly in the Chilean context, accreditation functions not only as a quality assurance tool but also as a filter that determines access to state benefits, such as free tuition, performance-based core funding, and other financial support instruments (Barroilhet *et al*., 2021). This

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dual function has generated a highly competitive and normatively demanding environment in which institutions must systematically demonstrate their capacity for self-regulation, continuous improvement, and institutional sustainability. In this context, it is important to note that circular dependencies may arise: better-funded universities obtain longer accreditations and, in turn, receive more funding.

Among the multiple factors influencing the outcomes of accreditation processes are elements such as the fulfillment of the educational project, the quality of academic programs, scientific output, internal quality assurance, community engagement, and—with increasing emphasis—the institution's financial viability (Rodríguez-Ponce, 2009; Calzone *et al*., 2013; Fussy, 2025; Rodríguez, 2025). However, although the specialized literature acknowledges the importance of the financial dimension in the operation and strategic development of universities, the available empirical evidence regarding its direct impact on institutional accreditation outcomes remains scarce and at times contradictory. Recent studies have reported that classical financial variables such as liquidity, solvency, or profitability do not exhibit statistically significant associations with the number of accreditation years obtained by Chilean universities (Rodríguez, 2025), a finding that is particularly paradoxical given the increasing economic pressure on the system.

In light of this apparent disconnect between financial performance and accreditation outcomes, a key question arises: which financial indicators influence the achievement of longer accreditation periods? This research seeks to provide empirical evidence regarding this question by exploring the relationship between financial variables and the number of institutional accreditation years granted to Chilean universities in 2023. Based on an analysis of 53 higher education institutions, an ordinary least squares (OLS) regression model was applied to identify which financial indicators significantly influence outcomes in the national quality assurance system.

The study focuses particularly on the operating margin (De Mesnard, 2025; Kaplan and Norton, 2005), understood as the ratio of ordinary activity revenues minus operating costs to ordinary activity revenues. This indicator reflects institutional efficiency in generating returns from core operations and has not been previously addressed in related research (Rodríguez, 2025). Conceptually, the operating margin may serve as a better predictor of accreditation outcomes than traditional financial measures such as liquidity or solvency, because it captures not only the availability of resources but also institutional capacity to manage them effectively. While liquidity and solvency indicate short-term financial health or the ability to meet obligations, the operating margin integrates aspects of operational efficiency, financial sustainability, and institutional autonomy. In other words, a university may have sufficient cash or low debt but still operate inefficiently, limiting its ability to maintain quality standards over time. By contrast, a high operating margin suggests that the institution is generating sustainable returns from its core activities, providing a more comprehensive reflection of financial management, resilience, and capacity to support long-term strategic goals.

The findings indicate that the operating margin, when controlled for total assets, has a positive and significant influence on the duration of institutional accreditation, highlighting its relevance as a key indicator of institutional quality and managerial effectiveness. This supports the hypothesis that not only the volume of available resources but also the efficiency in their management play a crucial role in institutional quality recognition. These results contribute to the academic and policy debate on the determinants of university quality, suggesting that a more comprehensive and context-sensitive perspective on financial variables enriches the understanding of accreditation processes and informs strategic decision-making in higher education.

Theoretical Foundations

University accreditation processes—understood as formal mechanisms of external evaluation that validate the overall quality of higher education institutions (Peterson and Augustine, 2000; Fernandes and Singh, 2022)—involve multiple interrelated variables that directly or indirectly influence compliance with the standards established by accrediting bodies (Ferreira *et al*., 2014; Rodríguez-Ponce, 2009). These variables shape a complex and multifactorial framework that assesses not only academic performance but also institutional capacity for self-regulation, sustainability, and continuous improvement.

Among the key elements commonly considered in these processes are: a) the definition and coherence of the institutional mission, understood as a guiding statement articulating the university's strategic purposes and core values (Morphew and Hartley, 2006); b) compliance with regulations related to scientific and technological development, particularly regarding the production of relevant knowledge and its transfer to society (Calzone *et al*., 2013); c) student performance indicators, such as retention, graduation, and completion rates, as well as student satisfaction levels (Khasanah, 2017); d) evidence of achievement of learning outcomes previously defined by academic units and their alignment with the graduate profile (Howard and Zoeller, 2007); e) the quality, accessibility, and currency of library systems, which are essential for teaching, research, and outreach activities (Eze Asogwa, 2014); f) scientific output, both in quantitative and qualitative terms, including indexed publications, participation in academic networks, and the securing of competitive funding (Fussy, 2025); and g) financial viability and economic sustainability, which ensure operational continuity and strategic development over the medium and long term (Rodríguez, 2025).

Additional emerging criteria include university social responsibility, inclusion and diversity (Ferreira *et al*., 2014), engagement with the external environment, academic talent management, and curricular innovation. Taken together, these variables make it possible not only to assess the current status of an institution but also to project its capacity to adapt to the increasingly dynamic and demanding challenges of higher education in both local and global contexts (Kallio *et al*., 2016).

Despite ongoing criticisms regarding the validity and reliability of institutional accreditation processes—widely discussed in the literature (Andreani *et al*., 2020; Barroilhet *et al*., 2021)—they continue to play a fundamental role in the positioning and legitimacy of higher education institutions within the global quality assurance system (Blanco Ramírez, 2015). In fact, accreditation functions as an international benchmark that enables comparisons among institutions (Motova and Pykkö, 2012), facilitating academic mobility, international cooperation, and the trust of key stakeholders, such as students, families, employers, and funding agencies.

Within this framework, various factors have been identified as influential in achieving positive accreditation outcomes. One of the most widely recognized is strategic planning, understood as institutional capacity to anticipate, organize, and coherently manage resources and processes to achieve quality and continuous improvement goals (Ramírez-Valdivia and Latorre, 2022). However, the apparent lack of robust empirical evidence regarding the impact of

financial variables on accreditation outcomes is striking. Specifically, the study conducted by Rodríguez (2025)—which used a quantitative approach with official data from the Chilean Superintendence of Higher Education (SES) and decisions of the National Accreditation Commission (NAC)—concluded that traditional financial variables used in management analysis, such as liquidity, solvency, and profitability ratios, do not show statistically significant correlations with the number of accreditation years granted to Chilean universities.

This finding appears counterintuitive. The financial situation of Chilean universities has been the subject of extensive public debate and technical reports, especially considering that a significant proportion of institutions face serious economic difficulties. According to the report by the Superintendence of Higher Education (2024), 20% of Chilean universities exhibit a very high financial risk profile, primarily due to high levels of debt, structural deficits, and questioned sustainability. In this context, a paradox arises: although financial resources condition an institution's ability to retain qualified staff, maintain infrastructure, adopt technologies, and provide support services—all of which are evaluated in accreditation processes—existing studies have not established a clear relationship between these variables and accreditation outcomes.

Moreover, this apparent disconnect acquires added importance considering that the Chilean quality assurance system directly links accreditation results with access to public funding. Universities that fail to attain accreditation or receive only a few years of it face limited eligibility for state financial benefits, such as performance-based core funding or access to tuition-free or student loan systems (Barroilhet *et al*., 2021). Thus, accreditation functions not only as a quality assurance mechanism but also as a gatekeeper for the resources needed to sustain or improve that quality—potentially generating a vicious cycle.

Given this situation, a central question arises for the present research: which financial indicators influence the achievement of a greater number of accreditation years? This study hypothesizes that there is indeed a relationship between institutional finances and the number of years of accreditation obtained, but that this relationship may lie in factors not captured by the financial indicators previously analyzed in the literature. Therefore, this research proposes to expand the analysis by incorporating other financial variables—different from those used by Rodríguez (2025)—to explore whether previously unexamined factors may provide more accurate insights into how financial processes affect institutional accreditation outcomes. This line of inquiry aims to contribute to the academic debate and inform higher education policy decisions with empirical evidence that clarifies the actual role finances play in university quality and accreditation.

Methodology

In this study, a quantitative methodological approach was adopted, following a design similar to that proposed by Rodríguez (2025), with the objective of exploring the relationship between financial variables and the number of institutional accreditation years granted to Chilean universities by the National Accreditation Commission (NAC). Only secondary data from official and public sources were used, specifically the financial reports submitted to the Superintendency of Higher Education (SES) and the institutional accreditation resolutions issued by the NAC. This approach ensures transparency, data traceability, and study replicability.

The population analyzed consisted of all universities that are part of the Chilean higher education system under state supervision and that, as of 2023, fulfilled two fundamental criteria: first, the obligation to officially publish their financial statements with the SES; and second, possession of a valid institutional accreditation resolution issued by the NAC. These criteria ensured the integrity and completeness of the data necessary for conducting the statistical analysis. Based on this population, a sample of 53 universities was selected, representing broad coverage of the Chilean university system. The study aimed to assess whether financial indicators can significantly predict the number of institutional accreditation years achieved by these universities.

Data collection involved systematically gathering the institutional accreditation resolutions issued by the NAC, along with the official financial statements published by the SES for the year 2023—the most recent year with finalized and audited information available at the time of data collection. The data were analyzed using the ordinary least squares (OLS) linear regression method, in order to estimate the influence of various financial variables on the number of institutional accreditation years attained. This statistical approach enabled the identification of linear associations between independent and dependent variables, determining the significance of each predictor and the proportion of variance explained by the model. In this way, the present research contributes empirical evidence to the ongoing debate regarding the role of institutional finances in quality assurance processes in higher education, addressing an area that has remained relatively underexplored in the specialized literature.

Results

In the analysis of results, among the set of financial variables considered, the operating margin emerged as the most relevant and statistically significant predictor in relation to the number of institutional accreditation years achieved by Chilean universities. This variable, which represents institutional efficiency in generating operational surpluses from total revenues, showed a positive correlation with accreditation years. This suggests that institutions with a greater ability to maintain positive margins in their operations tend to perform better in institutional quality evaluation processes. This finding led to the development of a specific regression model aimed at estimating the predictive capacity of the operating margin on the achievement of institutional accreditation years.

To strengthen the analysis and control for potential biases associated with institutional size, a second independent variable was incorporated: total assets, measured in billions of Chilean pesos. This variable was used as a proxy for university size, as it reflects the volume of economic and equity resources managed by the institutions, which may indirectly influence organizational performance, administrative capacities, and compliance with the quality standards required in accreditation processes. The inclusion of total assets in the model allowed control of the effects of institutional size, isolating the specific impact of the operating margin on the dependent variable. The OLS regression statistical model was specified using the following equation:

$$\text{Accreditation Years}_i = \beta_0 + \beta_1\,(\text{Operating Margin}_i) + \beta_2\,(\text{Total Assets}_i) + \varepsilon_i \quad (1)$$

Thus, the estimated model considered operating margin and total assets as independent variables, while the dependent variable corresponded to the current institutional accreditation years granted by the NAC. This bivariate approach made it possible to observe not only the direct influence of each predictor but also to examine the interaction between operational financial efficiency and

institutional scale in determining the recognition granted in quality assurance processes. Table I presents the descriptive statistics of the variables included in the model, providing an overview of the data distribution and a preliminary basis for interpreting the regression results developed in the following sections.

The data in Table I show the descriptive statistics for the three main variables used in the regression model: current institutional accreditation years, operating margin, and total assets. The analyzed sample consists of 53 Chilean universities belonging to the national higher education system, which, as of 2023, had official financial data available from the Superintendence of Higher Education and valid accreditation resolutions issued by the National Accreditation Commission.

Regarding the dependent variable, institutional accreditation years, the mean is 4.75 years with a standard deviation of 1.518. This average indicates that, in general, universities tend to achieve intermediate levels of accreditation within the NAC's established range of 2 to 7 years. The standard deviation suggests moderate variability among institutions, implying a relatively dispersed distribution of accreditation years obtained. This dispersion may reflect substantive differences in the degree of compliance with quality criteria required by the national quality assurance system.

For the first independent variable, operating margin, the mean is reported as 0.3649, or 36.49%. This financial indicator reveals that, on average, institutions generate an operating surplus of 36.5% of their income after covering direct operating costs, which can be interpreted as evidence of efficiency in resource management. However, the standard deviation of 0.5108 indicates high dispersion in operational performance across the universities analyzed. This finding suggests that while some institutions enjoy very favorable financial margins, others may operate with reduced or even negative margins, which is consistent with literature that highlights the structural heterogeneity of the Chilean university system.

Regarding total assets, used as a control variable and proxy for institutional size, the mean is CLP 185,188,529, with a standard deviation of CLP 202,022,074 (values expressed in billions of Chilean pesos). This wide spread in values reflects marked differences in the financial scale of Chilean universities. Some institutions, particularly traditional ones with large enrollment and regional presence, manage assets far above the average, while others—mainly smaller universities—have considerably more limited asset structures. This structural difference can have relevant implications when analyzing the effects of financial performance on accreditation results, since institutional size may modulate universities' capacity to implement improvements, sustain complex administrative processes, and meet quality standards.

Together, the descriptive statistics reveal marked heterogeneity among Chilean universities in their accreditation outcomes, financial performance, and institutional size. This variability underscores the need to use a model that considers not only individual financial indicators as predictors but also control factors such as institutional size to achieve a more precise and adjusted understanding of the phenomenon under study. In this context, Table II presents the relationships between the variables—accreditation years, operating margin, and total assets—through Pearson correlation analysis and evaluation of their statistical significance.

The results presented in Table II correspond to the bivariate Pearson correlation analysis among the three central variables of the model: institutional accreditation years, operating margin, and total assets, based on a sample of 53 universities belonging to the Chilean national higher education system. This statistical analysis aims to examine the strength, direction, and significance of the linear relationships between variables, which is fundamental for understanding the association

TABLE I
DESCRIPTIVE STATISTICS OF THE MODEL VARIABLES

Variable	Mean	Standard deviation	N
Accreditation years	4.75	1.518	53
Operating margin	0.364944708450340	0.510786154005861	53
Total assets	185188529.19	202022074.944	53

Source: Own elaboration based on NAC and SES, 2023. The total asset value is in billions of Chilean pesos.

TABLE II
CORRELATIONS BETWEEN MODEL VARIABLES

N: 53		Accreditation years	Operating margin	Total assets
Pearson Correlation	Accreditation years	1.000	0.348	0.645
	Operating margin	0.348	1.000	0.070
	Total assets	0.645	0.070	1.000
Sig. (unilateral)	Accreditation years	.	0.005	0.000
	Operating margin	0.005	.	0.309
	Total assets	.000	0.309	.

Sig.: Significance (p-value). Source: Own elaboration based on NAC and SES, 2023. The total asset value is in billions of Chilean pesos.

structure before progressing to more complex regression models.

First, a positive and statistically significant correlation was identified between institutional accreditation years and operating margin, with a Pearson coefficient of 0.348 and a one-tailed significance level of 0.005. This association can be interpreted as empirical evidence that universities demonstrating higher operational efficiency—i.e., those generating greater operational surplus relative to their revenues—tend to achieve better results in quality assurance processes, reflected in longer accreditation periods. The magnitude of this correlation suggests a moderate relationship that, while not decisive on its own, represents a relevant indicator of institutional performance.

Second, the relationship between accreditation years and total assets is also positive but of greater strength. The Pearson coefficient was 0.645, with a one-tailed significance level below 0.001, indicating a strong and highly significant association. Total assets, used as a proxy variable for institutional size, show a close linkage with accreditation years, which can be interpreted as reflecting the structural advantages possessed by larger universities. These institutions, having greater financial and asset resources, presumably have a higher capacity to implement quality assurance mechanisms, sustain complex internal processes, meet the criteria required by external evaluators, and maintain stable levels of infrastructure, management, and academic development.

In contrast, the relationship between operating margin and total assets did not exhibit statistical significance. The Pearson correlation coefficient was 0.070, with a one-tailed p-value of 0.309, preventing rejection of the null hypothesis of no relationship between the two variables. This lack of association suggests that institutional size—understood as the volume of financial and asset resources managed by a university—is not directly linked to its level of operational efficiency. In other words, large universities do not necessarily operate with better financial margins, nor do smaller ones inherently face disadvantages in this area. This independence between the two dimensions provides analytical value to their simultaneous inclusion in the regression model, as it allows capturing differentiated effects on institutional performance measured by accreditation years.

In summary, the results of the correlation matrix offer a preliminary empirical approach to the relationships between the model variables, providing evidence that justifies their inclusion in subsequent predictive analyses. The positive association between operating margin and accreditation years supports the hypothesis that financial efficiency influences institutional quality recognition, while the strong correlation between financial size and accreditation suggests that structural resources also play a decisive role. The independence between margin and size confirms the complementarity of both dimensions, supporting their joint consideration in regression models aimed at explaining variations in accreditation levels achieved by Chilean universities. These findings indicate that financial variables, far from being mere accounting indicators, exert a substantive influence on quality evaluation processes within the higher education system. In this context, Table III presents a summary of the linear regression model using total assets and operating margin as predictors, and accreditation years as the dependent variable.

Table III presents the summary of the linear regression model aimed at predicting the years of institutional accreditation based on two financial variables: operating margin and total assets. This model seeks to identify the joint explanatory power of these two variables on institutional performance, measured in years of accreditation, using a sample of 53 Chilean universities.

The multiple correlation coefficient (R) was 0.713, indicating a strong positive relationship between the set of independent variables (operating margin and total assets) and the dependent variable (years of accreditation). This value reflects the degree of linear association between the observed values and those predicted by the model.

The coefficient of determination (R^2) was 0.508, meaning that approximately 50.8% of the total variability in the years of institutional accreditation was explained by the two financial variables included in the model. This level of explanation is moderately high for social or educational studies, where multiple factors influence institutional outcomes, demonstrating a relevant explanatory capacity of the model.

The adjusted R^2, which corrects R^2 for the number of independent variables and the sample size, had a value of 0.489. This slightly lower figure suggests that the model maintained good explanatory power even after accounting for degrees of freedom, which is important to avoid overestimating predictive power in models with more than one independent variable.

The standard error of the estimate, equal to 1.085, represents the average deviation of the predicted values from the actual values of the dependent variable. A standard error close to 1 indicates that, on average, the model's predictions deviated by about one year from the actual accreditation value, which can be considered reasonably accurate within the analyzed institutional context—especially given that possible accreditation years in the Chilean system generally range from 2 to 7 years.

Finally, the Durbin-Watson statistic, with a value of 1.760, was used to detect the presence of autocorrelation in the residuals of the model (i.e., in the prediction errors). This statistic ranges from 0 to 4, and a value near 2 suggests no significant autocorrelation among the residuals. In this case, the value of 1.760 indicated no strong evidence of autocorrelation, validating a key assumption of the classical linear regression model and reinforcing the reliability of the analysis.

Together, the model summary indicators demonstrate that the proposed linear regression was statistically robust and effective in explaining years of institutional accreditation based on

TABLE III
SUMMARY OF THE LINEAR REGRESSION MODEL

Model [b]	R	R squared	Adjusted R squared	Standard error of estimate	Durbin-Watson
1	0.713[a]	0.508	0.489	1.085	1.760

[a]: Predictors: constant, total assets, operating margin. [b]: Dependent variable: accreditation years. R: Correlation coefficient. Source: Own elaboration based on NAC and SES, 2023. The total asset value is in billions of Chilean pesos.

financial variables. Both operating margin and total assets explained a significant proportion of the variability in institutional performance, and the model met fundamental assumptions such as error independence. These results suggest that financial dimensions—operational efficiency and institutional size—have a tangible impact on accreditation outcomes, which has important implications for university management and quality assurance policy design. In this context, Table IV presents the ANOVA analysis of the model.

Table IV presents the results of the analysis of variance (ANOVA) for the linear regression model in which the years of institutional accreditation served as the dependent variable, while operating margin and total assets were considered independent variables. The purpose of this analysis was to evaluate whether the model, as a whole, was statistically significant—that is, whether the selected financial variables explained a significant portion of the variability observed in the accreditation years of the Chilean universities included in the sample.

The data show that the total sum of squares was 119.811, representing the total variation in the dependent variable. This variability was divided into two main components: first, the regression sum of squares, which amounted to 60.902, corresponding to the portion of variability explained by the model based on the included predictors (i.e., operating margin and total assets). Second, the residual sum of squares, equal to 58.909, represented the variability unexplained by the model—that is, the variation due to random error or factors not included in the model specification.

Regarding degrees of freedom, the model had 2 degrees of freedom associated with the two predictor variables. The residual had 50 degrees of freedom, resulting from subtracting the number of estimated parameters (the constant and two coefficients for the independent variables) from the sample size (n =53). Altogether, this totaled 52 degrees of freedom, equivalent to $n - 1$, as is customary in this type of analysis.

The mean square, obtained by dividing each sum of squares by its respective degrees of freedom, was used to calculate the F statistic. In this case, the regression mean square was 30.451, while the residual mean square was 1.178. The ratio of these yielded an F value of 25.846, indicating that the variability explained by the model was more than twenty-five times greater than the unexplained variability. This result was accompanied by a significance value of $p = 0.000$, i.e., $p < 0.001$, indicating that the regression model was highly statistically significant. Practically, this means there was an extremely low probability (less than 0.1%) that the observed results were due to chance, reinforcing the validity of the proposed model.

In summary, the ANOVA results indicated that the linear regression model had a robust and significant explanatory capacity to predict years of institutional accreditation based on financial variables. The empirical evidence supported the hypothesis that both operational efficiency (reflected in the operating margin) and institutional size (represented by total assets) jointly and significantly impacted the outcomes of Chile's university quality assurance system. Thus, the model not only demonstrated statistical strength but also provided a relevant analytical framework to understand how certain economic attributes influence institutional performance measured by accreditation. In this context, Table V summarizes the coefficients of the variables included in the regression analysis.

Table V presents the coefficients obtained from the multiple linear regression model, in which the dependent variable corresponded to the years of institutional accreditation, while the independent variables included operating margin and total assets. This table allowed for a more precise examination of the specific contribution of each predictor to explaining the studied phenomenon, through two types of coefficients: unstandardized coefficients, which reflected the direct impact of each variable in its original unit of

TABLE IV
ANOVA OF THE MODEL

Model [a]	Sum of squares	df	Mean square	F	Sig.
Regression	60.902	2	30.451	25.846	.000 [b]
Residual	58.909	50	1.178		
Total	119.811	52			

[a]: Dependent variable: years of accreditation. [b]: Predictors: constant, total assets, operating margin. Sig.: Significance (p-value). Source: Own elaboration based on NAC and SES, 2023. The total asset value is in billions of Chilean pesos.

TABLE V
COEFFICIENTS OF THE VARIABLES IN THE LINEAR REGRESSION MODEL

Model: Dependent variable: years of accreditation	Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower limit	Upper limit
Constant	3.557	0.226		15.765	0.000	3.103	4.010
Operating margin	0.904	0.295	0.304	3.062	0.004	0.311	1.498
Total assets	4.687×10^{-9}	0.000	0.624	6.275	0.000	0.000	0.000

t: Student's t, sig.: Significance (p-value). Source: Own elaboration based on NAC and SES, 2023. The total asset value is in billions of Chilean pesos.

measurement, and standardized coefficients, which enabled comparison of the relative magnitude of each variable's effect within the model. Additionally, the table included t-statistics, significance levels (p-values), and 95% confidence intervals for the estimated coefficients, enabling evaluation of the robustness and statistical significance of each parameter.

First, the constant term or intercept of the model was 3.557, with a standard error of 0.226 and a t-value of 15.765, reaching a highly robust significance level ($p < 0.001$). This result suggested that, in a hypothetical scenario where the independent variables had a value of zero, the expected number of accreditation years would be approximately 3.56. Although this value lacked direct empirical interpretation—since in practice operating margin and total assets are unlikely to be zero—its statistical significance confirmed the validity of the intercept in terms of model fit.

Regarding the explanatory variables, the operating margin showed an unstandardized coefficient of 0.904, implying that, holding total assets constant, a one-unit increase in operating margin was associated with an expected increase of 0.904 years in institutional accreditation. This effect was statistically significant, as evidenced by a t-value of 3.062 and a significance level of p 0.004, below the 1% threshold. The standardized Beta coefficient, equal to 0.304, indicated that operating margin exerted a moderate impact on the dependent variable. The 95% confidence interval, ranging from 0.311 to 1.498, reinforced the strength of the observed effect, as it did not include zero and lay entirely within the positive range.

On the other hand, total assets, acting as an indicator of institutional economic size, exhibited an unstandardized coefficient of 4.687×10^{-9}, which may seem marginal when viewed in isolation. However, this value should be interpreted relative to the numerical magnitude typical of this variable in the context of higher education institutions, where assets are often expressed in multi-billion figures. In fact, the standardized Beta coefficient, reaching 0.624, revealed that total assets constituted the most influential predictor in the model. The statistical significance of this result was particularly notable, with a t-value of 6.275 and a p-value of 0.000, confirming that its effect was not attributable to chance ($p < 0.001$). Although expressed in scientific notation, the confidence interval for this coefficient remained within a narrow positive range, ensuring estimator stability.

Overall, the results indicated that both financial variables—the operating margin and total assets—had positive and significant effects on years of institutional accreditation. Nevertheless, the magnitude of the standardized Beta coefficient and the associated t and p values for total assets indicated that institutional financial size played a more decisive role in explaining the observed phenomenon. This difference in predictive strength suggested that the financial resources accumulated and managed by an institution were a crucial factor for achieving greater stability and duration in quality assurance processes.

From a broader analytical perspective, the findings presented in this table empirically supported the hypothesis that economic factors play a relevant role in institutional performance, at least with respect to the accreditation process. The discovery of positive and statistically significant effects for both selected variables validated the proposed model's structure and reinforced the idea that financial decisions, alongside operational efficiency, have concrete implications for the length of accreditation cycles. Thus, these results constituted a solid basis for developing institutional strategies aimed at strengthening universities' financial conditions, as well as for designing public policies that integrate economic dimensions into quality assurance criteria within the Chilean university system.

Table VI presents the results of the collinearity analysis applied to the predictor variables used in the multiple linear regression model, specifically operating margin and total assets, whose joint influence on institutional accreditation years was examined in previous sections. This analysis aimed to detect possible strong linear relationships between the independent variables, a phenomenon known as collinearity or multicollinearity, which can compromise the stability of the model's coefficients, reduce the precision of estimates, and hinder the interpretation of the individual effects of each predictor on the dependent variable.

To evaluate the presence of collinearity, two complementary statistical indicators were used: tolerance and the variance inflation factor (VIF). Tolerance is defined as the complement of the coefficient of determination ($1 - R^2$). High tolerance values (close to 1) indicate that a variable contains information not explained by the others, suggesting low collinearity. Conversely, low values, especially below 0.1, warn of potential problematic redundancies. In the reported data, both operating margin and total assets showed tolerance values of 0.995, indicating that both variables were practically free of collinearity; that is, each contributed a very high proportion of variance that was not shared with the other.

Meanwhile, VIF, calculated as the reciprocal of tolerance (VIF = 1 / tolerance), expresses how many times the variance of the estimator is inflated due to collinearity with other variables. VIF values below 5 are considered acceptable in most contexts, and those close to 1 indicate an almost complete absence of collinearity. In this case, both predictors had a VIF of 1.005, representing an optimal level. These values, so close to one, reinforce the conclusion that there was no significant linear relationship between operating margin and total assets that could compromise the independence of their effects.

Discussion

The results of this analysis of financial indicators in relation to university accreditation processes revealed that total assets constituted a key indicator of institutional capacity. Indeed, a university with a significant volume of assets not only reflected greater scale and financial strength but also the ability to sustain infrastructure, equipment, personnel, and long-term projects. This strength translated into a direct impact on the dimension of Strategic Management and Institutional Resources, while also indirectly supporting other core areas of accreditation, such as teaching, quality

TABLE VI
COLLINEARITY STATISTICS

Variable	Tolerance	VIF
Operational margin	0.995	1.005
Total assets	0.995	1.005
Total	119.811	52

VIF: Variance Inflation Factor. Source: Own elaboration based on NAC and SES, 2023. The total asset value is in billions of Chilean pesos.

assurance, community engagement, and research in those institutions where it is part of their mission.

In turn, the operating margin appeared as a reflection of management efficiency. The ability to generate surpluses from current revenues constituted a clear signal of administrative sustainability and financial discipline, aspects that particularly strengthened the dimension of Internal Quality Assurance. Moreover, this indicator acquired particular relevance in relatively smaller institutions, as it allowed them to compensate for structural limitations through efficient management practices that increased their chances of achieving better results in accreditation processes.

The interaction between both indicators, when simultaneously included in a multivariable model, provided a more precise interpretation of institutional performance. While total assets captured the effects derived from scale and financial base, the operating margin isolated and assessed the efficiency with which these resources were managed. This methodological complementarity offered a more refined and accurate analysis that shed greater light on the dynamics between financial sustainability and institutional quality. These elements were linked to the specific dimensions of institutional accreditation criteria, as detailed in Table VII.

From a strategic perspective, the findings in Table VII suggest that university policies should not be limited to strengthening the financial base but should also focus on consolidating the day-to-day management of resources. The combination of economic scale and administrative efficiency thus emerged as a complementary and mutually reinforcing path toward improving accreditation outcomes. In summary, total assets enabled institutions to meet the standards of infrastructure, resources, and technical capacity required by the quality assurance system, while a positive operating margin supported the sustainability of processes and continuous improvement. The convergence of both factors constituted a robust predictor of success in accreditation processes, as demonstrated by the estimated regression model.

Conclusions

Based on the results presented, it is possible to formulate a series of relevant conclusions that help to understand the relationship between the financial performance of higher education institutions and the years of institutional accreditation obtained. Specifically, the multiple linear regression model indicated that both operating margin and total assets exerted a positive and statistically significant influence on the duration of the recognition granted by quality assurance processes, although with notable differences in the intensity of their effects.

First, total assets, understood as a global measure of the university's economic size, emerged as the most influential predictor in the model. Its high standardized coefficient (Beta = 0.624), along with a considerably high t-value (6.275) and a robust level of statistical significance ($p < 0.001$), showed that institutions with greater assets tended to obtain longer accreditations. This finding suggested that accumulated financial capacity, reflected in infrastructure, equipment, permanent resources, and financial stability, constituted a key element in the perception of institutional quality and sustainability evaluated by accreditation bodies. Universities with larger assets could more comfortably meet the technical, administrative, and academic requirements of the quality assurance system, resulting in stronger support for continuous improvement processes, implementation of strategic plans, and sustainability of long-term institutional commitments.

On the other hand, the operating margin, which reflects efficiency

TABLE VII
DIMENSIONS OF CNA ACCREDITATION AND THEIR RELATIONSHIP WITH FINANCIAL INDICATORS

NAC Dimension (2023)	Relationship with total asset	Relationship with operating margin	Interpretation from the Discussion
Strategic management and institutional resources	They reflect the patrimonial scale, institutional infrastructure, and the capacity to sustain long-term projects.	Efficiency in resource utilization supports the sustainability of strategic management.	High asset levels enable institutions to meet infrastructure and organizational standards, while the operating margin ensures the sustainable management of these resources.
Teaching and learning outcomes	Higher asset levels facilitate investment in educational equipment, laboratories, and student services.	A positive operating margin ensures the continuity of academic programs and the stability of training processes.	Scale and financial efficiency lead to improved conditions for teaching and learning outcomes.
Internal quality assurance	Assets facilitate the financing of systems for evaluating and monitoring institutional quality.	Operational efficiency generates surpluses that support continuous improvement mechanisms.	Quality depends not only on infrastructure but also on discipline in daily management.
Community engagement	Patrimonial capacity enables the development of programs, centers, and projects with social impact.	Efficient management enables the continuity of engagement initiatives even under financial constraints.	External outreach is supported by institutional scale and by effective resource management.
Research, creation, and innovation	A broad patrimonial base facilitates investment in laboratories, libraries, and research projects.	The operating margin ensures the resources needed to sustain research lines in a stable manner.	The combination of assets and financial efficiency strengthens research as a dimension of institutional excellence.

NAC: National Accreditation Commission. Source: Own elaboration based on CNA and SES, 2023.

in managing current resources—that is, the proportion of surpluses generated relative to operating income—also exerted a positive influence on the years of accreditation, although of lesser relative magnitude (Beta = 0.304). Its unstandardized coefficient (B = 0.904) implied that, controlling for the institution's economic size, an increase in operational efficiency was associated with an increase in accreditation duration. This result was especially significant because it indicated that not only the volume of resources mattered but also how they were managed. In other words, among institutions with equal asset levels, those that used their resources more efficiently—achieving surpluses in their regular operations—tended to be recognized with longer accreditation periods. The statistical significance of this finding (p = 0.004) reinforced the interpretation that effective financial management contributed to consolidating the perception of institutional quality.

The simultaneous inclusion of operating margin and total assets in the model also allowed control for the effect of institutional size when evaluating operational efficiency, providing a more refined and methodologically rigorous interpretation. The fact that the operating margin maintained a positive and significant effect even after controlling for total assets indicated that financial sustainability strategies did not solely depend on having large volumes of assets but also on the ability to generate surpluses and manage them properly. This may have important implications for smaller institutions, which could compensate for structural limitations through efficient management practices that strengthen their performance in accreditation processes.

Overall, these findings supported the idea that quality assurance in higher education is not disconnected from the economic dimension; rather, it is strongly influenced by it. Both accumulated economic capacity and efficiency in the use of current resources emerged as key factors in obtaining longer accreditations. This provided empirical evidence that could guide both the design of institutional strategies and the formulation of public policies. From the perspective of university management, the results suggested that strengthening the financial base and improving financial efficiency could be complementary paths to reinforce institutional quality. From an educational policy standpoint, these findings called for the explicit inclusion of financial criteria in accreditation regulatory and evaluation frameworks, recognizing that academic quality cannot be sustained without adequate financial capacity to support it.

Limitations of the study

The present study had several limitations. For instance, it assumed the exogeneity of the financial variables included in the model, without explicitly addressing potential reverse causality or bias due to omitted variables. A longer accreditation period, for example, could facilitate access to financing or be correlated with institutional reputation—factors not controlled for in the current analysis. Furthermore, using financial indicators from the same year as the accreditation may have generated simultaneity issues; incorporating lagged operating margin and total assets, corresponding to the year prior to the most recent accreditation process, would help mitigate this risk. Similarly, reputation indicators that could influence both accreditation outcomes and financial health, such as international ranking positions, were not considered, nor was institutional maturity, which could be captured through the years since the university's founding and reflect the relationship between institutional experience, financial performance, and accreditation outcomes.

Other limitations related to presentation and analysis, as the study did not include graphical visualization of the data, which could more clearly support the proposed relationships between financial indicators and accreditation outcomes. Likewise, the Durbin-Watson test, when applied to cross-sectional data, was of limited informativeness; heteroskedasticity diagnostics and robust standard error corrections would have been more appropriate. Finally, estimating alternative models, such as a Linear Probability Model (LPM) or a Probit model with a binary dependent variable indicating the probability of obtaining a six- or seven-year accreditation, would allow capturing potential non-linearities and thresholds in the accreditation process.

Additionally, the analysis focused exclusively on 2023 data. It is important to explore whether similar results would be obtained when examining data from previous years. Given that the accreditation process spans multiple years, its relationship with financial variables may be dynamic or subject to lagged effects. Ideally, future studies should consider constructing a panel dataset to better capture temporal dynamics in accreditation outcomes and financial performance.

Another limitation of this study was that it did not account for other institutional characteristics that may influence accreditation outcomes. Factors such as institutional age, regional location, and type of university (e.g., CRUCH versus private) could affect both financial performance and accreditation results. Future research should consider including these variables to better understand their role and to isolate the specific impact of financial indicators on the duration of institutional accreditation.

Although total assets showed strong statistical significance in the analysis, this study did not delve into the underlying mechanisms driving this relationship. It remains unclear whether the effect reflected a greater capacity for investment, a larger workforce, or enhanced signaling power to stakeholders. Future research should aim to disentangle these potential channels to better understand how institutional size and resource endowment contribute to accreditation outcomes.

Overall, these limitations suggested that the results should be interpreted with caution and highlighted opportunities to strengthen future analyses of the relationship between financial performance and institutional accreditation.

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INFLUENCIA DE LOS FACTORES FINANCIEROS EN LOS RESULTADOS DE LOS PROCESOS DE ACREDITACIÓN EN UNIVERSIDADES CHILENAS

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RESUMEN

Los procesos de acreditación institucional constituyen un elemento estratégico para la sostenibilidad de las universidades, ya que contribuyen a validar su funcionamiento, garantizar el acceso estudiantil y facilitar la obtención de recursos financieros. Diversos factores influyen en el éxito de estos procesos, incluidas las variables financieras. El objetivo principal de este estudio fue analizar la influencia de las variables financieras en la obtención de un mayor número de años de acreditación institucional en universidades chilenas, destacando la relevancia del margen operacional y los activos totales. A partir del análisis de una muestra de 53 instituciones de educación superior en 2023, se empleó un modelo de regresión por mínimos cuadrados ordinarios (OLS), que reveló la importancia del margen operacional y los activos totales en los resultados de acreditación. El estudio concluye que una gestión financiera sólida y eficiente ejerce un impacto positivo en la consecución de un mayor número de años de acreditación institucional.

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RESUMO

Os processos de acreditação institucional constituem um elemento estratégico para a sustentabilidade das universidades, pois contribuem para validar seu funcionamento, garantir o acesso estudantil e facilitar a obtenção de recursos financeiros. Diversos fatores influenciam o êxito desses processos, incluindo as variáveis financeiras. O objetivo principal deste estudo foi analisar a influência das variáveis financeiras na obtenção de um maior número de anos de acreditação institucional em universidades chilenas, destacando a relevância da margem operacional e dos ativos totais. A partir da análise de uma amostra de 53 instituições de ensino superior em 2023, foi empregado um modelo de regressão por mínimos quadrados ordinários (OLS), que revelou a importância da margem operacional e dos ativos totais nos resultados de acreditação. O estudo conclui que uma gestão financeira sólida e eficiente exerce um impacto positivo na conquista de um maior número de anos de acreditação institucional.