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RELATIONSHIP BETWEEN LEVERAGE AND CORPORATE PROFITABILITY IN CHILE: THE MODERATING EFFECT OF IFRS

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Abstract: This study investigates the relationship between leverage and corporate profitability in Chile, with a focus on the moderating effect of adopting International Financial Reporting Standards (IFRS) since 2013. We used a System-GMM approach to analyze 41 companies from the Selective Share Price Index (IPSA) over the period 2008-2023. We find that, prior to IFRS implementation, there was a negative relationship between leverage and profitability. However, following the adoption of these standards, the relationship became neutral. The findings suggest that the enhanced quality of financial information provided by IFRS can influence strategic decisions regarding corporate financing and management, underscoring the importance of transparency in an emerging economy.

Palabras clave: Corporate capital structure, International Financial Reporting Standards (IFRS), Emerging Economy, Firm Performance.

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Relación entre apalancamiento y rentabilidad corporativa en Chile: El efecto moderador de las NIIF

Resumen: Este estudio investiga la relación entre el apalancamiento y la rentabilidad corporativa en Chile, con un enfoque en el efecto moderador de haber adoptado las Normas Internacionales de Información Financiera (NIIF) en 2013. Utilizamos un enfoque System-GMM para analizar 41 empresas del Índice Selectivo de Precios de Acciones (IPSA) durante el período de 2008 a 2023. Si bien encontramos una relación negativa entre el apalancamiento y la rentabilidad durante los años anteriores a la adopción de las NIIF, esta relación se volvió neutral a partir de entonces. Estos hallazgos sugieren que la mejor calidad de la información financiera proporcionada por las NIIF puede influir en las decisiones estratégicas relacionadas con el financiamiento y la gestión corporativa, lo que subraya la importancia de la transparencia en una economía emergente

Palabras clave: estructura de capital corporativo, Normas Internacionales de Información Financiera (NIIF), economía emergente, desempeño empresarial.

1 INTRODUCTION

Leverage, a key concept in financial theory, involves using debt or external capital to expand a company's investment capacity. This approach directly influences profitability by amplifying both potential returns and risks. The relationship between a company's debt ratio (or leverage) and its profitability has been widely studied in corporate finance. (Modigliani & Miller, 1958) laid the foundations of the capital structure, arguing that, in perfect markets, the capital structure did not affect value. However, they revised their perspective when considering the presence of taxes, proposing that companies should finance themselves entirely with debt to take advantage of tax benefits (Modigliani & Miller, 1963). After these findings, theories that predict the effect of leverage on profitability were constructed, such as the theory of trade-off (Myers, 1977) and the theory of pecking order (Myers & Majluf, 1984), which assume a positive relationship between leverage and company performance. However, the empirical evidence in this regard is inconclusive, with mixed results being found in different contexts. Therefore, it is necessary to continue deepening this relationship to identify the particularities that explain it.

Chile, as a leading emerging economy in Latin America, is noteworthy for its sustained economic growth, with a gross domestic product (GDP) per capita of approximately $15,000 USD in 2022 (World Bank, 2022) and for its high Human Development Index (HDI) of 0.855 that same year (PNUD, 2022). This study focuses on companies listed in the Selective Stock Price Index (IPSA), which represents the top stocks in the Chilean market, to analyze how the adoption of International Financial Reporting Standards (IFRS) has influenced the relationship between leverage and profitability. Given that Chile was one of the first Latin American countries to mandate IFRS adoption in 2013 the research offers unique insights into the long-term effects of this transition on financial transparency and corporate performance (Pacter, 2017). The findings are not only relevant to Chile but also provide valuable lessons for other emerging economies aiming to enhance financial reporting practices and attract foreign investment.

This research involves the mandatory adoption of International Financial Reporting Standards (IFRS), as a way to reduce information asymmetries through standardized and higher-quality accounting reports (Gassen & Sellhorn, 2006). This factor is relevant since it could moderate the relationship between leverage and profitability. Even so, there are few studies that analyze the moderating effect of IFRS adoption on the relationship between leverage and corporate profitability. While Abdullah & Tursoy (2021) have explored these phenomena in developed economies, our work extends this line of research to the Latin American context. We adopt a similar methodological approach but adapt it to the particularities of the Chilean context and consider factors unique to its emerging economy.

Specifically, in emerging economies where access to financing and investment are crucial for business development (Memon et al., 2021). Research shows that while in

developed countries a positive relationship between leverage and profitability is generally found (Berger & Bonaccorsi di Patti, 2006), in developing countries a negative relationship is often observed (Chechet & Olayiwola, 2014); (Le & Phan, 2017). This may be due to structural differences between countries, such as the degree of development of financial markets, the level of legal protection for investors and the quality of corporate information available.

Considering the above, the objective of this study analyzes the relationship between financial leverage and corporate profitability in Chile, evaluating the moderating impact of IFRS on this relationship. This work contributes to the literature by addressing this research question in an emerging economy such as Chile, where the mandatory adoption of IFRS took place in 2013. Our results show that the adoption of IFRS implies a change between the relationship between leverage and company performance, being negative before the implementation of IFRS and neutral afterwards.

This research is structured as follows: the theoretical framework of the research is presented, the methodology that explains the sample, the variables, the origin of the data and estimation processes, then the results and the discussion of the same are presented, and finally the conclusions of the research.

2 THEORETICAL FRAMEWORK

The impact of leverage on firm performance has been extensively explored in key financial theories. Modigliani and Miller's (1963) seminal work, based on perfect competition assumptions, posits a linearly increasing relationship between debt level and performance. However, this linear relationship was challenged by Myers' (1977) trade-off theory, which proposes that an increase in leverage leads to a reduced probability of meeting short-term obligations, consequently elevating the firm's financial risk and cost of debt, which ultimately results in a negative impact on firm performance when leverage exceeds a critical threshold, thereby suggesting the existence of an optimal capital structure.

For developed countries, previous research has found empirical evidence of a positive correlation between debt ratio and performance (Berger & Bonaccorsi di Patti, 2006). However, in underdeveloped nations, this relationship tends to be inverted due to factors specific to the economic development of each country (Chechet & Olayiwola, 2014; Le & Phan, 2017). Apart from the level of development, other exogenous variables, such as company size, board size, or the CEO´s ownership percentage, could play a crucial role in determining the relationship between debt and profitability. A summary of the current literature and the country-specific findings are summarized in Table 1.

Reducing information asymmetry is crucial in amplifying the influence of leverage on profitability. The mandatory adoption of IFRS, which provides a standardized financial reporting framework, is recognized as a key measure to reduce this asymmetry (Gassen and Sellhorn, 2006). As such, IFRS may act as a moderating factor in the relationship between leverage and firm performance. Over the past few decades, IFRS adoption has grown globally, including in emerging economies where it is often mandatory. Countries

like Argentina, Brazil, Chile, Mexico, and others in Latin America, as well as regions like Eastern Europe, Africa, the Middle East, and Asia, implemented IFRS during the 2000s (Pacter, 2017). IFRS has been shown to improve the quality of financial information, reduce information asymmetries, facilitate access to external financing, and lower the cost of capital (Houqe et al., 2012). This suggests that IFRS adoption decreases information asymmetry, potentially strengthening the link between debt and corporate performance, thus playing a pivotal role in enhancing the relationship between leverage and profitability by leveling the playing field for financial reporting.

Table 1. Summary of related studies

Author(s)	Year	Country	Relationship between leverage and performance
(Adair et al.)	2015	France	Positive (+)
(Berger & Bonaccorsi di Patti)	2006	USA.	Positive (+)
(Chechet & Olayiwola)	2014	Nigeria	Negative (-)
(Le & Phan)	2017	Vietnam	Negative (-)
(Abdullah & Tursoy)	2021	Germany	Positive (+)
(Santos-Garcia & Lopes-Lucena)	2022	Brazil	Negative (-)

Source: Own elaboration

Although the literature on IFRS adoption, leverage and profitability is limited, studies suggest that the implementation of these standards improves transparency and reduces information asymmetries (Van Beusichem et al., 2016). For example, Devalle et al. (2014) found that the relevance of accounting information increased for European firms when comparing periods before and after IFRS adoption. This supports the notion that IFRS adoption could moderate (or weaken) a positive relationship between debt and profitability. However, uncertainty remains as to whether this moderating effect holds in countries where the leverage-profitability relationship is negative. Nnadi and Soobaroyen (2015) found that in African countries, IFRS adoption negatively affected foreign direct investment, contrary to findings in developed economies, suggesting that the benefits of IFRS may depend on local institutional factors. In contrast, Santos and Cavalcante (2014) found in Brazil that while IFRS adoption increased the relevance of accounting information, it did not necessarily improve the quality of reported results. These findings highlight that the effects of IFRS may be more complex and dependent on the observed context (Memon et al., 2021; Vo & Ellis, 2017).

In Chile, Muñoz-Mendoza et al. (2019) found that IFRS implementation led to shorter debt maturities in large companies due to the emergence of agency conflicts. Similarly, Rojas Molina (2022) showed that while 70% of Chilean companies experienced a positive equity impact after adopting IFRS 15, only 8% reported significant changes. These findings suggest that IFRS adoption in Chile has had mixed effects, with outcomes depending on the specific factors analyzed within a firm.

Under these antecedents, this paper studies the hypothesis that there is a negative relationship between debt ratio and performance in Chilean companies and that IFRS could affect this relationship in such a way that the relationship is attenuated, annulated or reversed, given that the adoption of IFRS has a positive impact on the quality and

frequency of accounting information, which makes it easier for investors to evaluate the value of the company and, consequently, their investment decision, is that the negative relationship between leverage and profitability in Chile should be attenuated, annulated or reversed.

3 METHODOLOGY

3.1 Sample

We obtained end-of-year accounting information from Eikon Refinitiv for 41 companies listed from 2008 to 2023 in the Chilean "Selective Stock Price Index" (IPSA in Spanish). Companies from the financial and health sectors were excluded due to particularities in their types of operations, accounting data, and capital structure policies. Since IRFS became mandatory in Chile in 2013, accounting data are divided into a pre- (2008-2012) and post-IFRS (2013-2023) periods. It should be noted that IFRS became a permitted accounting standard already from 2009 onward; however, since it remained optional until 2013, we do not separate the data into pre- and post-2009 periods.

3.2 Variables

To measure firm performance, we employ the market-to-book ratio (MTB), a widely used metric in corporate finance. MTB is the sum of a company's market capitalization and total assets, minus total equity, all divided by total assets. This measure captures both market perception and accounting-based performance. Several studies have utilized MTB when examining firm performance in regression analyses. For instance, Dang et al. (2019) used enterprise value (EV) and Tobin's Q as key performance indicators in their analysis of capital structure and firm performance.

Similar to Flannery & Rangan (2006), Kim (2018), McLean & Zhao (2014), and Welch (2004), we measure capital structure (leverage) as the ratio of total debt to the sum of total debt and market capitalization. This ratio, denoted as 'LEV', serves as our primary explanatory variable. Furthermore, this approach is particularly useful since it reflects actual market value instead of historical accounting values, thus a better measure of market perceptions of a company's risk.

To quantify the effect of IFRS adoption, we employ a methodology similar to that of Abdullah & Tursoy (2021), introducing a dichotomous variable, "IFRS", to divide the sample data into pre- and post-IFRS implementation periods corresponding to IFRS=0 and 1, respectively. This approach is consistent with Houqe et al. (2012), who emphasized the importance of considering the effect of IFRS adoption in financial reporting studies. To isolate the moderating effect of IFRS implementation on the leverage-performance relationship, we include an interaction term between the IFRS and leverage variables, following the work of Abdullah & Tursoy (2021). This interaction term, IFRS×Lev, allows us to capture any changes in the leverage-performance relationship following IFRS adoption. This methodology aligns with Daske et al. (2008), who highlighted the

importance of considering both direct and indirect effects of IFRS adoption on firm outcomes.

Several control variables are employed to isolate the effect of leverage and its interaction with IFRS adoption on performance. Following Wintoki et al. (2012), we include the lag of firm performance to account for potential dynamic endogeneity. Firm size, measured as the natural logarithm of total assets, denoted as "size", is included to control for scale effects (Fosu et al., 2016). Sales growth rate, "growth", is used to capture firm-specific growth opportunities (Le & Phan, 2017). These variables help reduce potential biases due to omitted variables.

Macroeconomic effects in Chile are controlled by introducing two key variables: Chile's Central Bank's Monetary Policy Rate (TPM, for its acronym in Spanish) and the variation in Chile's consumer price index as a measure of inflation, denoted as IPC. These controls are particularly relevant in emerging markets, where macroeconomic instability can impact firm performance (Fosu et al., 2016). TPM captures the monetary conditions that could affect firms' financing decisions and, consequently, the leverage-performance relationship (Matemilola et al., 2019). Inflation considers the overall economic environment, as it can affect both market valuations and financing decisions, especially in emerging economies (Chowdhury & Chowdhury, 2010).

We also incorporated a series of yearly dummy variables to account for social and other relevant phenomena in Chile, such as the impacts of the social unrests in October 2019 or the COVID-19 pandemic and subsequent lockdowns, the first having occurred in March 2020. Following the approach of Espinosa-Méndez and Arias (2021), we include dummy variables for the years 2019-2023, denoted as "d19-23", respectively. These variables are set to "1" for their respective years and to "0" otherwise. This approach allows us to control for year-specific effects that could impact firm performance, particularly during periods of significant social and economic disruption.

Our choice of this specific set of variables is supported by extensive empirical evidence in corporate finance literature. For instance, we chose Market-to-Book ratio instead of Return on Assets (ROA) or Return on Equity (ROE) as performance measure because it better captures both current performance and growth opportunities (Dang et al., 2019; McLean & Zhao, 2014). Moreover, Welch (2004) and Flannery & Rangan (2006) have demonstrated that the market-based leverage measure is better suited to reflect actual financial constraints and market perceptions of risk compared to book leverage. Size and growth were selected as control variables following Le & Phan (2017) and Fosu et al. (2016), who highlighted their fundamental role in emerging markets' capital structure decisions. The inclusion of monetary policy rate and inflation indices, rather than GDP growth or exchange rates, is particularly relevant in the Chilean context, as demonstrated by Muñoz-Mendoza et al. (2019), who showed that these variables significantly influence financing decisions in Latin American markets. The robustness of our variable selection is further supported by Abdullah & Tursoy (2021), who used a similar set of variables to analyze IFRS adoption effects on the leverage-performance relationship, and demonstrated that they were effective at capturing the key dynamics of this interaction

while avoiding multicollinearity issues that could arise from including additional overlapping measures.

3.3 The model.

The research model follows Abdullah & Tursoy (2021), Le & Phan (2017), and Wahba (2014) who proposed a linear relationship between leverage and performance based on the following equation:

$$R_{it} = \beta LEV_{it} + \gamma X_{it} + \delta Z_{it} + \varepsilon_i \,, \quad (1)$$

Where R_it corresponds to the performance of firm i at time t, 〖LEV〗 it is the leverage of firm i at time t; X_it corresponds to the dichotomous and interaction variables that divide the sample into periods before and after mandatory adoption of IFRS; Z_it represents the vector of control variables Size, Growth, TPM, IPC and other dichotomous variables for the various relevant periods at a social, macroeconomic and sanitary level in Chile for firm i at time t; ε_i is a stochastic error term.

Weighted ordinary least squares estimators are consistent and unbiased if the residuals are not correlated with the independent variables, which is not the case in this study, since firms are expected to have specific effects (characteristics) (Le & Phan, 2017). It is therefore preferable to use fixed effects, although this makes it impossible to control for potential heteroskedasticity, autocorrelation, or endogeneity, with the latter being the most serious problem. If the absence of endogeneity cannot not proven, it becomes impossible to affirm a causal relationship between variables, but only an association (Roberts & Whited, 2013). Furthermore, we account for dynamic endogeneity by introducing a lag in the dependent variable (Wintoki et al., 2012).

This results in a Two-Step System GMM regression, as developed by Roodman (2006) and complementary to the Arellano & Bond model (1991). It represents a superior methodological approach, as the implementation of lagged independent variables as instruments (specifically using second-order lags as done here) effectively addresses the endogeneity concerns inherent in our main variables, thus enabling us not only to establish associations between variables, but also to make substantiated claims about causal relationships within our empirical framework.

Nonetheless, to validate the robustness of our empirical findings, we supplement our main analysis with alternative econometric specifications. Specifically, we estimate our baseline model using Ordinary Least Squares (OLS), firm fixed-effects estimators, and instrumental variable regressions. This comprehensive set of alternative specifications enables us to examine whether the documented relationships remain consistent across different methodological assumptions and estimation techniques, thereby enhancing the reliability and validity of our empirical inferences. In addition, as part of our sensitivity analysis we contrast the model estimates for firms above and below the size median, as well as firms above and below the leverage median.

Thus, the equation to be estimated is:

$$MTB_{it} = \beta_0 + \beta_1 MTB_{i,t-1} + \beta_2 LEV_{it} + \beta_3 GROWTH_{it} + \beta_4 SIZE_{it} + \beta_5 IFRS + \beta_6 IFRS * LEV_{it} + \beta_7 TPM_t + \beta_8 IPC_t + \varepsilon_i \,, \quad (2)$$

While our methodological approach shares similarities with previous studies in developed markets (Abdullah & Tursoy, 2021), we specifically tailored our analysis to the Chilean context by considering the macroeconomic implications of the October 2019 social unrest in Chile, which significantly impacted firm performance and market dynamics to prevent bias in our model. Additionally, and in line with Espinosa-Méndez & Arias (2021), we include control variables to capture the effects of the COVID-19 pandemic on Chilean firms from 2020 onwards. These adaptations allow us to capture the unique characteristics and recent socioeconomic events affecting the Chilean market while maintaining methodological rigor.

4 DATA ANALYSIS

Table 2. Shows a summary of the descriptive statistics of the variables used in this paper.

Variable	Type	Mean	Std. dev.	Min	Max	Observations
MTB	Overall	1.254	0.555	0.349	5.286	N = 656
	Between		0.427	0.696	2.948	n = 41
	Within		0.360	-0.148	4.012	T = 16
LEV	Overall	0.358	0.201	0.000	0.978	N = 656
	Between		0.148	0.047	0.656	n = 41
	Within		0.137	-0.007	0.786	T = 16
Growth	Overall	0.057	0.257	-1.000	2.742	N = 611
	Between		0.079	-0.280	0.249	n = 41
	Within		0.247	-0.781	2.589	T = 15
Size	Overall	21.496	1.388	17.873	24.330	N = 656
	Between		1.374	18.118	24.005	n = 41
	Within		0.289	20.437	22.716	T = 16
TPM	Overall	4.063	2.635	1.000	10.000	T = 16
IPC	Overall	4.090	2.846	0.353	11.644	T = 16

Note: N = Total observations; n = Number of groups; T = Number of periods. Source: Own elaboration

Table 3 presents the correlation matrix among the main variables of this paper. Results show a negative and statistically significant correlation between MTB and LEV of -0.5295, suggesting a moderate to strong inverse relationship between these variables. Growth exhibits a positive albeit weak correlation (0.1770) with market value, while macroeconomic variables, while TPM and IPC show significant negative correlations with market value (-0.1205 and -0.2305, respectively). Notably, there is a strong positive correlation (0.7694) between the macroeconomic variables, although not strong enough to cause collinearity. Size is positively correlated with LEV (0.1785), indicating that larger firms tend to have higher debt levels. Overall, these preliminary correlations are consistent

with the hypothesis of a negative relationship between leverage and market value in the Chilean context. Results from the correlation analysis show on Table 3.

Table 2. Correlation matrix

Variables	MTB	LEV	Growth	Size	TPM	IPC
MTB	1					
LEV	-0.529*	1				
Growth	0.177*	-0.108*	1			
Size	0.003	0.179*	0.011	1		
TPM	-0.121*	0.172*	0.016	0.009	1	
IPC	-0.231*	0.310*	0.060	0.003	0.769*	1

Note: * $p < 0.05$; Source: Own elaboration

4.1 Model results

The modelling results (Table 4) indicate that past performance, measured as the previous year's Market-to-Book ratio (Lag(MTB)), has a significant positive impact on current performance, with a one-unit increase in the previous year's MTB leading to a 0.467 increase in the current MTB. In contrast, leverage has a substantial negative effect on performance, with a one-unit increase in leverage resulting in a 5.080 decrease in MTB. Growth has a positive influence (significant only at a 90% confidence level) with a one-unit increase in growth contributing to a 0.292 rise in MTB. IFRS adoption appears to have resulted in a negative impact initially, decreasing MTB by 1.226. Interestingly, the interaction between IFRS adoption and leverage (IFRS×LEV) reveals a positive effect of 4.408, suggesting that post-IFRS adoption, the negative impact of leverage on performance was significantly mitigated. In fact, performing a Linear Combination of Estimators (Lincom) test to examine the total effect of leverage on MTB after IFRS adoption (Table 5), we found this effect to be substantially smaller than the initial leverage effect and not significant at a 95% confidence level. Thus, post-IFRS adoption, leverage had no impact on performance. Additionally, during the period 2019-2021 we observed a negative impact on performance with yearly MTB decreases of 0.166, 0.165, and 0.189, respectively. This is consistent with large-scale events, such as the 2019 social unrest and COVID-19 pandemic, both producing a negative impact due to the generated economic and financial uncertainty.

These findings indicate that in Chile, where the relationship between leverage and performance was previously negative, IFRS adoption had a moderating effect and resulted in the neutralization of this relationship. This aligns with evidence from other Latin American economies, such as Brazil (Santos & Cavalcante, 2014) and Mexico (Vásquez Quevedo, 2013), where companies experienced a reduction in their capital costs after IFRS adoption, as well as improvements in profitability indicators, particularly among early adopters. Similarly, in other emerging economies like India (Chougule, 2023) and Turkey (Ozkaya, 2018), companies reported enhanced profitability indicators and lower capital costs. However, these benefits were found to be more significant in large, internationally operating firms with strong corporate governance practices.

Table 3. Equation estimation

Variables	**MTB**
Lag(MTB)	0.467***
	(0.0505)
LEV	-5.080**
	(2.057)
Growth	0.292*
	(0.171)
Size	0.0289
	(0.0276)
IFRS	-1.226***
	(0.467)
IFRS*LEV	4.408**
	(2.088)
d19	-0.166***
	(0.0456)
d20	-0.165***
	(0.0600)
d21	-0.189***
	(0.0692)
d22	0.167
	(0.173)
d23	0.274
	(0.193)
TPM	-0.0390
	(0.0267)
IPC	-0.00858
	(0.00934)
Constant	1.671**
	(0.760)
Observations	529
Number of id	41
AR(1)	-1.98**
AR(2)	-1.25
Hansen Over Id.	36.62
Hansen Levels	31.60
Difference	5.02
Hansen for I.V.	31.36
Difference	5.26
Standard errors in parentheses	

*** p<0.01, ** p<0.05, * p<0.1

Source: Own elaboration

A Hansen's test was performed to assess the validity of our instrumental variables and identify potential issues related to over-identification. Results indicated that the null hypothesis cannot be rejected, i.e., instrumental variables are valid and there are no issues with over-identification. In addition, Hansen's difference tests indicate that the endogeneity problem has been addressed successfully through our choice of instrumental

variables. Furthermore, while an Arellano-Bond test indicates the presence of first-order serial correlation (AR(1)) in the first-differenced residuals, which is expected in dynamic panel models, the absence of second-order serial correlation (AR(2)) supports the validity of our model specification and confirms the appropriateness of using lags of t-2 (and onwards) as instruments, thus strengthening the reliability of our Two-Step System-GMM estimates.

Table 4. Lincom test output.

MTB	Coefficient	Std. Error	z	P > |z|	[95% Confidence Interval]	
	-0.6725976	0.3453998	-1.95	0.051	-1.349569	0.0043736

Source: own elaboration.

4.2 Robustness tests and alternative specifications

Table 6 presents a comprehensive comparison between our main Two-Step System GMM estimates and alternative specifications using Ordinary Least Squares (OLS), Fixed Effects (FE), and Instrumental Variables – Two-Stage Least Squares (IV-2SLS) models. The results broadly support our main findings, although with some differences in the magnitude of coefficients. MTB, measured by its lagged value, remains positive and highly significant across all specifications, albeit with a lower coefficient in the System GMM (0.467) compared to OLS (0.783), which may indicate that OLS overestimates the persistence effect, potentially due to dynamic panel bias. The negative impact of leverage (LEV) and the positive moderating effect of IFRS adoption (IFRS×LEV) remain consistent across all specifications, though the System GMM estimates indicate stronger economic effects (-5.080 and 4.408, respectively). Growth opportunities maintain their positive association with firm value across all specifications, with System GMM showing a moderate effect (0.289). Notably, the dummy coefficients that were introduced to represent social factors such as unrest and COVID-related economic downturn (d19-d21) remain remarkably consistent across all specifications in terms of both sign and significance, reinforcing the robustness of our findings regarding the impact of the COVID-19 pandemic on firm performance. The consistency of these results across different estimation methods, each having different underlying assumptions and approaches for treating endogeneity, provides strong support for the reliability of our main findings.

Table 5. Alternative estimation methods - Robustness analysis of Two-Step System GMM estimates.

	MTB			
VARIABLES	**Two-Step System GMM**	**OLS**	**FE**	**IV-2SLS**
Lag(MTB)	0.467***	0.783***	0.507***	0.424***
	(0.0505)	(0.0452)	(0.0451)	(0.0974)
LEV	-5.080**	-0.862***	-1.144***	-1.431**
	(2.057)	(0.306)	(0.384)	(0.577)
Growth	0.292*	0.0834**	0.0612	0.178***
	(0.171)	(0.0405)	(0.0509)	(0.0485)
Size	0.0289	0.00565	-0.142**	0.0164
	(0.0276)	(0.00884)	(0.0623)	(0.0113)

IFRS	-1.226***	-0.259**	-0.323***	-0.310*
	(0.467)	(0.104)	(0.117)	(0.182)
IFRS*LEV	4.408**	0.646**	0.785*	0.801
	(2.088)	(0.324)	(0.401)	(0.574)
d19	-0.166***	-0.225***	-0.175***	-0.136***
	(0.0456)	(0.0383)	(0.0366)	(0.0526)
d20	-0.165***	-0.218***	-0.168***	-0.117
	(0.0600)	(0.0505)	(0.0287)	(0.0783)
d21	-0.189***	-0.246***	-0.204***	-0.146**
	(0.0692)	(0.0479)	(0.0307)	(0.0683)
d22	0.167	0.446***	0.247***	0.165
	(0.173)	(0.119)	(0.0859)	(0.208)
d23	0.274	0.542***	0.299***	0.219
	(0.193)	(0.100)	(0.0706)	(0.187)
TPM	-0.0390	-0.0754***	-0.0445***	-0.0289
	(0.0267)	(0.0145)	(0.00919)	(0.0241)
IPC	-0.00858	-0.00676	-0.00770	-0.00950
	(0.00934)	(0.0115)	(0.00736)	(0.0151)
Constant	1.671**	0.747***	4.289***	1.015***
	(0.760)	(0.229)	(1.351)	(0.313)
Observations	529	611	611	529
R-squared		0.795	0.612	0.723
Number of id	41		41	
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Source: Own elaboration

4.3 Heterogeneous effects: the role of firm size

Our analysis of the heterogeneous effects of firm size on the leverage-performance relationship revealed that when controlling for size effects, leverage continues to exhibit a significant negative impact on firm performance (-5.148, $p<0.05$), while the moderating effect of IFRS adoption remains positive (4.512, $p<0.05$) (Table 7). Notably, neither firms above the median dichotomic variable (LARGE) nor its interaction with leverage (LARGE*LEV) was statistically significant (0.167, $p=0.740$ and -0.073, $p=0.940$, respectively). MTB's lag value shows stronger persistence at 0.456 ($p<0.01$) compared to our baseline model's 0.303.

A linear combination test confirmed that the net effect of leverage following IFRS implementation remains statistically insignificant (-0.636, $p=0.141$) (Table 8). These results suggest that firm size does not play a significant role in moderating the effects of leverage on firm performance. This finding may be related to the fact that our sample only contained IPSA-listed companies, i.e., firms that are relatively large.

While our results contrast with the assertion by Frank and Goyal (2009) that larger firms benefit from enhanced financing access, they align with the observations by Beck and Demirguc-Kunt (2006) about persistent financial constraints in emerging economies, regardless of firm size. The absence of significant size effects may also reflect Cassar's

(2004) arguments regarding the complexity of size-related advantages in corporate financing decisions, particularly within emerging market contexts.

Table 6. Leverage on firm performance: The role of firm size.

VARIABLES	MTB
Lag(MTB)	0.456***
	(0.0733)
LEV	-5.148**
	(2.272)
Growth	0.290
	(0.204)
Size	-0.0210
	(0.0787)
IFRS	-1.246***
	(0.415)
IFRS*LEV	4.512**
	(1.994)
LARGE	0.167
	(0.502)
LARGE*LEV	-0.0733
	(0.968)
d19	-0.171***
	(0.0525)
d20	-0.173**
	(0.0707)
d21	-0.189**
	(0.0804)
d22	0.198
	(0.221)
d23	0.288
	(0.218)
TPM	-0.0396
	(0.0307)
IPC	-0.0118
	(0.0111)
Constant	2.716*
	(1.553)
Observations	529
Number of id	41
AR(1)	-1.8
AR(2)	-1.22
Hansen Over Id.	36.15
Hansen Levels	30.82
Difference	5.34
Hansen for I.V.	34.64
Difference	1.51

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Own elaboration.

Table 7. Lincom test output.

MTB	Coefficient	Std. Error	z	P > |z|	[95% Confidence Interval]	
	-.6355673	.4316157	-1.47	0.141	-1.481519	.210384

Source: Own elaboration.

4.4 Heterogeneous effects: the role of leverage levels

When examining how firms' existing leverage levels influence the leverage-performance relationship, our model results (Table 9) reveal several interesting patterns. Then, MTB decreased to 0.303 ($p<0.01$) compared to our baseline model, which suggests that controlling for leverage affects the dynamics of firm performance. While the baseline negative effect of leverage remains significant and substantial (-7.907, $p<0.01$), highly leveraged firms (above-median leveraged firms have HIGH LEV = 1) exhibit a distinct pattern, as indicated by the positive and significant HIGH LEV×LEV coefficient (3.813, $p<0.05$). This finding suggests that additional leverage has a less detrimental effect on highly leveraged firms.

These heterogeneous results can be explained theoretically. Firstly, according to Diamond's (1991) reputation-building hypothesis, firms that successfully maintain high leverage levels may have developed better relationships with creditors and demonstrated superior debt management capabilities. Secondly, as suggested by Lemmon et al. (2008), firms with persistently high leverage might have underlying characteristics that make them better suited to handle debt financing, such as more stable cash flows or valuable collateral assets. The positive HIGH LEV×LEV coefficient supports this view, suggesting that highly leveraged firms face lower marginal costs when taking on additional debt.

The interaction between IFRS adoption and leverage (IFRS×LEV) was found to be statistically non-significant (3.195, $p=0.149$), suggesting that the moderating effect of IFRS adoption might be partially captured by the leverage level effect, which would be consistent with Daske et al.'s (2013) argument that the benefits of improved disclosure vary based on a firm's existing financial characteristics.

Table 8. Leverage on firm performance: The role of leverage levels.

VARIABLES	MTB
Lag(MTB)	0.303***
	(0.0832)
LEV	-7.907***
	(2.488)
Growth	0.115
	(0.247)
Size	0.0307
	(0.0416)
IFRS	-0.950*
	(0.506)
IFRS*LEV	3.195
	(2.213)
HIGH LEV	-0.681

	(0.736)
HIGH LEV*LEV	3.813**
	(1.665)
d19	0.0140
	(0.0833)
d20	0.153
	(0.133)
d21	0.217
	(0.199)
d22	0.290
	(0.323)
d23	0.320
	(0.283)
TPM	0.00395
	(0.0325)
IPC	-0.00753
	(0.0193)
Constant	2.199**
	(1.088)
Observations	529
Number of id	41
AR(1)	-0.59
AR(2)	-1.60
Hansen Over Id.	30.12
Hansen Levels	30.59
Difference	-0.47
Hansen for I.V.	24.84
Difference	5.28

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Own elaboration.

5 DISCUSSION

In this study we could demonstrate the existence of a relationship between leverage and profitability for large-cap Chilean companies during the period 2008-2023. Prior to the mandatory adoption of IFRS in 2013, most companies exhibited a negative relationship between leverage and profitability, consistent with previous findings for other emerging economies which suggested that higher debt levels can lead to an increase in financing costs and, therefore, a decrease in performance (Appiah et al., 2020; Uyar et al., 2016). This phenomenon can be explained through trade-off theory, which posits that firms balance the tax benefits of debt with the costs of bankruptcy (Myers, 1977). However, the implementation of IFRS erased this relationship, in the sense that higher leverage was no longer associated with a change in performance.

This fundamental change can be attributed to the higher transparency requirements that accompanied the introduction of IFRS, which led to a reduction in information asymmetry, increased financial stability, and market confidence (Abu Alrub et al., 2020). The increased transparency and standardized reporting meant that investors and creditors were in a better position to judge the financial situation of companies, reducing their

perceived risk, and thus lowering the company's capital costs (Barth et al., 2023). Consequently, the adoption of IFRS can facilitate access to financing, incentivizing companies to increase their leverage, which in turn could improve their profitability through increased operating leverage.

Previous studies have found evidence that companies with higher leverage experience better performance as a result of IFRS adoption, which suggests that these standards have not only improved the quality of financial reporting but also influence companies' strategic financing decisions (Uyar et al., 2016). Similarly, the adoption of IFRS may have incentivized companies to adopt more rigorous and results-oriented management practices, since the need to comply with international standards can lead to greater financial discipline and better strategic planning. Therefore, the change in the relationship between leverage and profitability in the IFRS context not only highlights the importance of the quality of financial information, but also suggests that these standards are transforming the dynamics of financing and corporate management in Chile. Nevertheless, considerable progress remains necessary before this relationship can yield positive outcomes and its implications become more pronounced in Chile, which serves as a benchmark economy in Latin America.

Our study period (2008–2023) covers two significant macroeconomic events that impacted business performance: the social unrest in Chile in October 2019 and the COVID-19 pandemic. We found that both events had a negative and significant effect on the relationship between leverage and business performance. However, the implementation of IFRS helped to neutralize this relationship, highlighting the crucial role of these regulations even in volatile contexts. Notably, these negative effects did not extend significantly into 2022–2023, reflecting a rapid economic recovery and a return to social stability. This unique interaction between social and health crises sets the Chilean case apart and highlights how international accounting standards can affect macroeconomic development, even in a country undergoing highly volatile situations.

6 CONCLUSIONS

The results obtained confirm our originally stated hypothesis. Before the mandatory adoption of IFRS, there was a negative relationship between leverage and profitability among large-cap Chilean companies. This is consistent with previous studies of other emerging economies that found an inverse association between debt and profitability. While the adoption of IFRS resulted in a significant worsening of company performance, it erased the previously existing relationship between leverage and performance. The former was due to added IFRS implementation and adaptation costs, while the latter was a result of the IFRS-related improvements in financial data quality and transparency, allowing companies to manage their debt levels more efficiently.

Additionally, our results showed that past performance is an important predictor of future performance in the Chilean market, which suggests that the effects of financial and operational decisions, including those related to capital structure, have lasting impacts.

This is particularly relevant for investors and managers, as it implies that investment and financing strategies should consider longer time horizons.

With Chile being a developing country, we expected leverage to be inversely related to accounting performance. However, we did not find an relation between leverage and performance once IFRS had become mandatory.

This study provides evidence for the mitigating effect of IFRS adoption on the connection between debt and corporate performance in large-cap Chilean companies.

Future research should analyze the specific mechanisms through which the adoption of different IFRS standards affects the relationship between leverage and performance, e.g., the differential impacts of specific standards such as IFRS 9 (Financial Instruments) or IFRS 15 (Revenue from Contracts with Customers). In addition, comparative studies should be conducted to investigate the effects of IFRS adoption in other emerging economies, and to determine whether our results can be generalized.

Our sample was composed of IPSA-indexed companies from key sectors such as finance, retail, energy, and mining, thus providing a broad context in which to examine the relationship between leverage and profitability in Chile. These industries are fundamental to the Chilean economy and represent a significant part of national GDP and employment. Therefore, this paper also recognizes the limitation of the analysis by economic sectors of Chilean IPSA-indexed companies, which could generate valuable insights and implications for the industry level on these topics.

CONTRIBUTIONS FROM THE AUTHORS

Edison, Gutiérrez-Garcés: construction of data, methodology and formal analysis. Daniela, Niño-Amézquita: conceptualization, theorization, writing and revision. All authors have read and accepted the published version of the manuscript.

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DATA AVAILABILITY STATEMENT

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CONFLICTS OF INTEREST:

The authors declare that they have no conflict of interest.

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