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Institutional Environment and Corporate Leverage in Latin America

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Abstract

This study examines how corruption control and financial freedom are associated with total leverage in Latin America. The analysis uses a panel of 729 listed non-financial firms from Argentina, Brazil, Chile, Colombia, Mexico, and Peru over 2014–2024, totaling 7,241 firm-year observations. Firm fixed-effects models with year effects and standard errors clustered by firm show that financial freedom is negatively associated with total leverage, whereas the coefficient on corruption control is positive but not statistically significant. A ten-index-point increase in financial freedom is associated with a 2.95-percentage-point decrease in the debt-to-assets ratio. Additional analysis indicates that leverage was higher during and after the COVID-19 shock than in 2014–2019 and that the negative association between financial freedom and leverage weakened after 2019. A leave-one-country-out analysis identifies Argentina as an influential case: excluding it reverses the sign of the financial-freedom coefficient. Because this pattern was identified ex post, it is interpreted as exploratory evidence rather than a confirmed country effect. Overall, the results indicate that financial freedom is associated with firms' reliance on debt, while the relationship between corruption control and leverage is not stable at the regional level.

1 Introduction

Capital structure remains a central question in corporate finance because financing choices reflect taxes, expected distress costs, agency conflicts, information asymmetry, and access to external capital (Modigliani and Miller 1958, 1963; Jensen and Meckling 1976; Myers and Majluf 1984). Although firm characteristics explain an important share of leverage variation, international evidence shows that country-level conditions affect financing directly and also modify the role of firm-level determinants (Booth et al. 2001; de Jong et al. 2008; Fan et al. 2012). Consequently, models developed for deep and stable financial markets may not transfer mechanically to emerging economies.

The institutional environment affects creditors' ability to enforce contracts, assess risk, and recover claims. It also affects the range of financing instruments available to firms. Corruption control captures the extent to which public power is protected from private capture, while financial freedom reflects the degree of government intervention and the efficiency and independence of the financial sector. Both dimensions can alter credit supply, borrowing costs, and firms' choice between debt and equity. Their expected associations with leverage are nevertheless ambiguous. Stronger institutions can expand debt capacity by reducing contracting risk, but they can also deepen equity markets and reduce firms' dependence on borrowing (La Porta et al. 1997, 1998; Ariss 2016).

Latin America is a useful setting for studying this ambiguity. The region combines related legal and historical traditions with marked differences in institutional quality, financial development, macroeconomic stability, and credit-market structure. Earlier research confirms that standard firm-level determinants remain relevant in Latin American countries, but it also finds that macroeconomic and institutional factors contribute to cross-country differences in financing (Aguinis et al. 2020; Bastos and Nakamura 2009; Bernardo et al. 2018). Updated evidence is particularly relevant because the last decade includes institutional changes, financial-market adjustments, and the COVID-19 shock.

Against this background, the research question is: how are corruption control and financial freedom associated with the total leverage of listed non-financial firms in Latin America? These two institutional dimensions and total debt divided by total assets define the main empirical model. The study covers 2014–2024. The COVID-19 period is examined only as an additional temporal finding and does not organize the article's hypotheses or principal analysis.

The study makes three contributions. First, it provides recent firm-level evidence on the associations of corruption control and financial freedom with total leverage across six large Latin American economies, using a common sample and firm fixed effects. Second, it distinguishes the two institutional mechanisms: corruption control reflects constraints on the private capture of public power, whereas financial freedom reflects the operation and independence of the financial system. Third, the sensitivity analysis identifies Argentina as an influential case. Because this heterogeneity was not specified ex ante and is not supported by a dedicated country-level design, it is reported as an exploratory finding and a priority for future research.

2 Theoretical background and hypotheses

2.1 Firm-level determinants of capital structure

Trade-off theory proposes that firms balance the tax benefits of debt against expected distress and agency costs. Pecking-order theory instead emphasizes information asymmetry and predicts a preference for internal funds, followed by debt and, lastly, external equity (Myers 1984; Myers and Majluf 1984). Agency theory highlights conflicts among managers, shareholders, and creditors and the potential disciplinary role of debt (Jensen and Meckling 1976; Jensen 1986). These perspectives motivate recurring controls for firm size, asset tangibility, and profitability. Larger firms tend to be more diversified and face lower information costs; tangible assets provide collateral; and profitable firms may borrow less when internal funds are available (Rajan and Zingales 1995; Frank and Goyal 2009).

Evidence from Latin America broadly confirms these determinants while showing that their magnitude varies across countries and periods. Bastos and Nakamura (2009) and Bernardo et al. (2018) find that firm characteristics explain a substantial part of financing behavior, but the country environment remains relevant. The empirical models therefore include size, tangibility, profitability, and real GDP growth so that institutional coefficients represent conditional within-firm associations.

2.2 Corruption control and leverage

Weak corruption control can raise uncertainty, transaction costs, and the risk that contracts will not be applied predictably. Creditors may respond by restricting loan supply, shortening maturities, or increasing risk premiums. From this perspective, improvements in corruption control should expand debt capacity. A competing mechanism is also plausible: more predictable institutions can support equity-market development and reduce reliance on bank debt. International evidence thus supports the relevance of institutions but not an invariant coefficient sign (La Porta et al. 1997, 1998; de Jong et al. 2008; Fan et al. 2012; Ariss 2016). Given these offsetting channels, the hypothesis is non-directional.

H1: Corruption control is significantly associated with the leverage of listed non-financial firms in Latin America.

2.3 Financial freedom and leverage

Financial freedom reflects limited government interference, competitive financial intermediation, and the ability of financial institutions to allocate credit. Greater freedom can increase debt supply and lower financing frictions. However, it may simultaneously broaden equity financing and reduce dependence on debt. The net association therefore depends on the relative development of credit and equity channels and on country-specific institutional arrangements (Beck and Levine 2002; Allen et al. 2018).

H2: Financial freedom is significantly associated with the leverage of listed non-financial firms in Latin America.

2.4 COVID-19 period as an additional analysis

The COVID-19 shock affected liquidity needs, operating cash flows, credit conditions, and refinancing decisions. Its consequences for leverage are theoretically ambiguous: precautionary borrowing can increase debt, while credit rationing, repayment, and reduced investment can decrease it. Because the pandemic is not part of the main research question, differences among the pre-pandemic period (2014–2019), pandemic period (2020–2021), and post-pandemic period (2022–2024) are examined as additional evidence, without a separate hypothesis.

3 Data and methods

3.1 Sample and data

The initial database combines annual accounting information from S&P Capital IQ with country-year institutional indicators. The sample consists of listed non-financial firms headquartered in Argentina, Brazil, Chile, Colombia, Mexico, and Peru. Financial firms are excluded because their leverage is shaped by regulatory capital requirements and because debt has a different operational meaning in financial intermediation. Firm-year observations with non-positive equity were excluded. Continuous firm-level variables were winsorized at the 5th and 95th percentiles to reduce the influence of extreme observations.

The common estimation sample contains 7,241 firm-year observations for 729 firms over 2014–2024. Brazil represents 2,789 observations, Chile 1,400, Mexico 1,112, Peru 848, Argentina 652, and Colombia 440. The panel is unbalanced, with a minimum of two and a maximum of 11 observations per firm. Institutional data are drawn from the Worldwide Governance Indicators and the Heritage Index of Economic Freedom; real GDP growth is obtained from the World Bank. The end year reflects the institutional-data vintage available when the database was assembled.

3.2 Variable description and measurement

Total leverage, the dependent variable in the main model, is measured as total debt divided by total assets. The focal explanatory variables are corruption control and financial freedom, both expressed on a 0-100 scale, with higher values denoting better corruption control and greater financial freedom. Firm size is the natural logarithm of total assets; tangibility is fixed assets divided by total assets; profitability is EBIT divided by total assets; and GDP growth is the annual percentage change in real GDP. Long- and short-term leverage are used only as alternative dependent variables in sensitivity tests. Table 1 presents the definitions and data sources of the variables examined in the study.

Table 1
Variable definitions

Variable	Definition	Source
Total leverage	Total debt / total assets	S&P Capital IQ
Corruption control	WGI index rescaled to 0-100; higher values indicate better control	World Bank WGI
Financial freedom	Financial Freedom Index, 0-100; higher values indicate greater freedom	Heritage Foundation
Size	Natural logarithm of total assets	S&P Capital IQ
Tangibility	Fixed assets / total assets	S&P Capital IQ
Profitability	EBIT / total assets	S&P Capital IQ
GDP growth	Annual real GDP growth, percent	World Bank

Source: Own elaboration

3.3 Model specification and estimation procedures

The baseline specification is a two-way fixed-effects model:

$$Lev_{it} = \beta_1 size_{it} + \beta_2 tang_{it} + \beta_3 prof_{it} + \beta_4 gdpv_{it} + \beta_5 corrup_{it} + \beta_6 finfree_t + \alpha_i + \delta_t + \epsilon_{it}$$

where Lev_{it} represents the leverage of firm *i* in period *t*; *size* corresponds to the size of the company; *tang* represents the tangibility of assets; *prof* corresponds to profitability; *gdpv* represents GDP growth; *corrup* corresponds to country corruption control; and *finfree* is country financial freedom.

The term α_i represents the firm-specific fixed effects, controlling unobservable time-invariant firm characteristics, while δ_t captures year fixed effects associated with macroeconomic shocks and common temporal effects. The term ϵ_{it} denotes the idiosyncratic error term.

Firm effects absorb time-invariant characteristics, including persistent industry membership and country affiliation, while year effects absorb shocks common to all countries. Standard errors are clustered by firm to allow serial correlation and heteroskedasticity within firms.

The coefficients are interpreted as conditional associations rather than causal effects because institutional changes are not randomly assigned and may be jointly determined with financial development.

Pooled ordinary least squares, random effects, the Breusch-Pagan Lagrange multiplier test, and the Hausman comparison were used as specification diagnostics. The tests favor models that account for unobserved firm heterogeneity, and the main specification therefore uses firm fixed effects.

Additional analyses examine COVID-period indicators and their interactions with the two focal institutional variables. Sensitivity tests use alternative leverage maturities, EBITDA-based profitability, and sequential country exclusions. These analyses assess temporal and cross-country heterogeneity without changing the primary model or its dependent variable.

4 Results and Discussions

Table 2 presents the descriptive statistics of the variables used in the analysis. Total leverage mean is 0.258, with a standard deviation of 0.179. Corruption control averages 44.28 and financial freedom 58.52. The within-firm standard deviations of corruption control and financial freedom are 1.76 and 4.43 points, respectively, indicating that identification relies on smaller temporal changes than the cross-sectional dispersion of these indices. This feature is expected in fixed-effects models of slowly changing institutions and reinforces the need to report economically meaningful increments.

Table 2
Descriptive statistics

Variable	Obs	Mean	Std.Dev	Minimum	Maximum
Total leverage	7,241	0.258	0.179	0.000	0.717
Corruption control	7,241	44.280	13.789	28.663	75.911
Financial freedom	7,241	58.520	8.824	30.000	70.000

Notes: Firm-level continuous variables were winsorized at the 5th and 95th percentiles. Institutional indices range from 0 to 100.

Source: Research data.

Table 3 reports the main fixed-effects estimates for total leverage. Corruption control has a positive coefficient (0.00184) but is not statistically different from zero at conventional levels ($p = 0.128$); H1 is therefore not supported. Financial freedom has a negative coefficient (-0.00295, $p < 0.001$), supporting H2. Because financial freedom is measured on a 0-100 index, a ten-index-point increase is associated with a 0.0295 reduction in the debt-to-assets ratio, equivalent to 2.95 percentage points of total assets. This magnitude is economically material relative to mean leverage of 25.78%, but it should be interpreted as a conditional association rather than a causal effect.

The negative coefficient does not imply that financial liberalization reduces the amount of credit available. A plausible interpretation is that a freer financial system expands firms' financing set, including equity and market-based instruments, thereby reducing the debt share of assets. It may also reflect deleveraging and more selective capital allocation. The fixed-effects design identifies changes within firms over time, so the estimate should not be read as a cross-sectional comparison between financially free and restricted countries.

The firm-level controls follow established capital-structure predictions. Size and tangibility are positively associated with total leverage, consistent with lower information costs and greater collateral capacity. Profitability is negatively associated with leverage, consistent with the pecking-order prediction that firms with more internal funds rely less on borrowing. Real GDP growth is negatively associated with leverage in the main model. These estimates describe conditional associations and do not establish the underlying mechanisms.

Table 3
Main model of corruption control financial freedom and total leverage

Variable	Main model
Corruption control	0.0018
	(0.0012)
Financial freedom	-0.0030***
	(0.0006)
Size	0.0315***
	(0.0070)
Tangibility	0.1622***
	(0.0349)
Profitability	-0.1421***
	(0.0310)
GDP growth	-0.0023***
	(0.0006)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	7,241
Firms	729
Within R^2	0.0800

Notes: Dependent variable is total debt divided by total assets. Firm-clustered standard errors in parentheses. ** p < 0.05; *** p < 0.01. Year coefficients and constants are omitted.

Source: Research data.

The COVID-period models, as shown in Table 4, replace annual effects with period indicators. Relative to 2014–2019, leverage is 1.30 percentage points higher in 2020–2021 and 1.29 percentage points higher in 2022–2024. The two period indicators are jointly significant (F = 6.33, p = 0.0019). These estimates are descriptive complements: they capture all common differences between the periods that are not absorbed by the included controls and should not be interpreted as the causal effect of the pandemic.

Interactions show no statistically significant change in the corruption-control slope across periods (joint p = 0.3688). Financial-freedom interactions are jointly significant (p = 0.0324), but the marginal effects indicate that its negative association is concentrated in the pre-pandemic period. The marginal effect is -0.00280 before the pandemic (p < 0.001), -0.00125 during 2020–2021 (p = 0.126), and − 0.00169 after the pandemic (p = 0.068). The evidence therefore suggests attenuation rather than a reversal after 2019.

Table 4
Complementary COVID-period results

Estimate	Coefficient	SE	p value
Pandemic period 2020–2021 vs 2014–2019	0.0130	0.0037	< 0.001
Post-pandemic 2022–2024 vs 2014–2019	0.0129	0.0046	0.005
Corruption control marginal effect: pre-pandemic	0.0016	0.0010	0.093
Corruption control marginal effect: pandemic	0.0015	0.0010	0.131
Corruption control marginal effect: post-pandemic	0.0019	0.0011	0.076
Financial freedom marginal effect: pre-pandemic	-0.0028	0.0006	< 0.001
Financial freedom marginal effect: pandemic	-0.0013	0.0008	0.126
Financial freedom marginal effect: post-pandemic	-0.0017	0.0009	0.068
Notes: Firm fixed effects are included. Period models do not include annual fixed effects because period indicators are exact functions of year. Marginal effects are from the interacting model.			

Source: Research data.

Alternative dependent variables yield a negative association between financial freedom and long-term leverage (-0.00130, p = 0.042) but no significant association with short-term leverage. Corruption control is not significant in either maturity model. Replacing EBIT/assets with EBITDA/assets leaves the principal Model pattern nearly unchanged: corruption control remains non-significant and financial freedom remains negative and significant. These checks support the baseline result for financial freedom, although missing maturity information reduces the long-term and short-term samples to 5,867 and 2,414 observations, respectively.

Sequentially excluding one country at a time (Table 5) reveals that Argentina is influential. When Argentina is removed, the corruption-control coefficient changes from 0.00184 to -0.00080 and remains non-significant, while the financial-freedom coefficient changes from − 0.00295 to 0.00331 and becomes statistically significant. Excluding any of the other countries leaves financial freedom negative and statistically significant. This pattern means that the regional average for financial freedom is not homogeneous and is strongly shaped by Argentina's institutional and macroeconomic trajectory.

Table 5
Leave-one-country-out sensitivity

Excluded country	Corruption control	Financial freedom	Observations
None	0.0018	-0.0030***	7,241
Argentina	-0.0008	0.0033***	6,589
Brazil	0.0024**	-0.0047***	4,452
Chile	0.0038**	-0.0034***	5,841
Colombia	0.0016	-0.0029***	6,801
Mexico	0.0029**	-0.0030***	6,129
Peru	0.0019	-0.0031***	6,393

Notes: Each row reports Model 1 after excluding the indicated country. Firm and year fixed effects and firm-clustered standard errors are used. ** p < 0.05; *** p < 0.01.

Source: Research data.

The Argentina result was discovered during sensitivity analysis and was not a preregistered hypothesis. It is therefore treated as exploratory. A country interaction model, a longer Argentine time series, and variables capturing inflation, exchange controls, sovereign risk, and domestic credit-market interventions are needed before a mechanism can be identified. The finding nevertheless matters because it demonstrates that pooled regional coefficients can conceal country relationships with opposite signs.

The baseline evidence supports a significant negative association between financial freedom and leverage but does not support a statistically significant association for corruption control. This result differs from a simple credit-supply argument in which institutional improvement necessarily increases borrowing. Instead, the evidence is consistent with the possibility that financial freedom broadens financing alternatives and enables listed firms to rely relatively less on debt. This interpretation is compatible with research emphasizing that financial structure depends on the architecture of markets and institutions, not only on credit availability (Beck and Levine 2002; Allen et al. 2018).

The non-significant coefficient for corruption control should not be interpreted as evidence that corruption is irrelevant to corporate finance. Corruption control changes slowly within countries, which limits the within-firm temporal variation available to the fixed-effects estimator. In addition, the country-exclusion results indicate that an average across six economies can conceal national heterogeneity. The restrained conclusion is therefore that the present sample does not establish a stable region-wide association between corruption control and total leverage.

The control variables reinforce established capital-structure mechanisms. Positive coefficients for size and tangibility suggest that scale and collateral capacity facilitate debt use, whereas the negative profitability coefficient is consistent with internal financing under the pecking order. These results align with Rajan and Zingales (1995), Frank and Goyal (2009), and Latin American evidence from Bastos and Nakamura (2009) and Bernardo et al. (2018).

The COVID-period estimates are an additional finding rather than an alternative explanation for the main results. Leverage was higher during and after the shock, consistent with precautionary liquidity accumulation, refinancing needs, or balance-sheet adjustment. The association between financial freedom and leverage also weakened after 2019. Exceptional policy interventions, shifts in credit supply, and changes in firms' financing needs may have contributed to this temporal pattern, but the design cannot isolate a causal pandemic mechanism. The evidence therefore documents temporal heterogeneity and motivates further investigation.

For managers and investors, the results imply that country indicators should be interpreted jointly with national financing regimes. A regional score may not predict financing behavior when one economy experiences capital controls, high inflation, or recurrent sovereign stress. For policymakers, strengthening institutions may change the composition of external finance rather than simply increase debt. The practical implication is to evaluate whether reforms deepen both credit and equity markets and whether firms of different sizes gain similar access.

6 Conclusions

This study examined the associations of corruption control and financial freedom with total leverage among listed non-financial firms in six Latin American countries from 2014 to 2024. The main findings differ between the two institutional dimensions. Financial freedom is negatively and statistically significantly associated with total leverage. A ten-index-point increase in financial freedom is associated with an estimated 2.95-percentage-point decrease in the debt-to-assets ratio. This magnitude is economically relevant relative to the sample mean of total leverage.

The negative association suggests that a more open and competitive financial system may broaden firms' financing alternatives, including access to equity and market-based instruments, thereby reducing their relative dependence on debt. Nevertheless, this interpretation represents a potential mechanism rather than a causal conclusion, given the observational nature of the research design.

By contrast, the coefficient on corruption control is positive but not statistically significant in the main fixed-effects model. Therefore, the results do not support a stable region-wide association between corruption control and total leverage. This finding should not be interpreted as evidence that corruption control is irrelevant to corporate financing. The indicator changes slowly over time within countries, which limits the variation available for identification in a firm fixed-effects model. Its relationship with leverage may also depend on country-specific legal, financial, and macroeconomic conditions.

The COVID-19 results complement the principal institutional analysis. Total leverage was higher during 2020–2021 and 2022–2024 than in the 2014–2019 period. In addition, the negative association between financial freedom and leverage weakened after 2019. These findings indicate temporal heterogeneity in firms' financing behavior but should not be interpreted as the causal effect of the pandemic because the period indicators may capture other contemporaneous economic and policy changes.

The leave-one-country-out analysis also revealed an unexpected result for Argentina. When Argentina is excluded from the sample, the coefficient on financial freedom changes from negative to positive and remains statistically significant. The coefficients obtained after excluding the other countries do not exhibit the same reversal. This finding indicates that the regional association between financial freedom and leverage is substantially influenced by the Argentine observations. Because the result was identified ex post and was not

derived from a previously specified country-level hypothesis, it should be treated as exploratory evidence rather than as a confirmed Argentine effect.

For corporate managers, the results indicate that capital structure decisions should consider the institutional and financial environment in which the firm operates. Greater financial freedom may be associated with broader access to equity, market-based instruments, and alternative sources of finance. Managers operating in more financially open environments may therefore have greater scope to diversify their funding sources, reduce excessive dependence on debt, and increase financial flexibility.

However, the exploratory result for Argentina demonstrates that regional institutional indicators should not be applied mechanically to individual countries. Managers should evaluate financial freedom together with domestic inflation, exchange-rate risk, capital and exchange controls, sovereign risk, local credit conditions, and the currency composition of corporate debt. These country-specific factors can alter both the availability and relative attractiveness of debt and equity financing.

For government regulators and policymakers, the findings suggest that financial-sector reforms may affect not only the volume of external financing available to firms but also its composition. Policies that promote competition, financial-system independence, market transparency, and access to diversified financing instruments may reduce firms' dependence on bank borrowing by expanding equity and market-based financing alternatives.

Future research should extend the analysis to other countries and a longer period to increase institutional variation and assess the generalizability of the findings. The unexpected Argentine result also warrants a dedicated investigation incorporating inflation, exchange-rate regimes, capital controls, sovereign risk, domestic interest rates, and foreign-currency debt. Such analysis could clarify whether the coefficient reversal reflects Argentina's institutional and macroeconomic conditions or a broader mechanism relevant to other emerging economies.

Declarations

Author Contribution

C.R. collected data and run model. W.N. provided variables and model guidance. All authors wrote and reviewed the manuscript text.

Data Availability

Firm-level data were obtained from S&P Capital IQ under license and cannot be redistributed publicly. Institutional and macroeconomic indicators are publicly available from the World Bank Worldwide Governance Indicators, the World Bank World Development Indicators, and the Heritage Foundation Index of Economic Freedom. The analytical code and a replication file containing shareable inputs may be made available by the corresponding author subject to data-license restrictions.

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