RLQR: A new liquidity index for leveraged companies and its application in solvency prediction

Suelem Meireles do Nascimento Barreiros
Suelem.barreiros@gmail.com

Dr. Roberto Miranda Pimentel Fully
FUCAPE BUSINESS SCHOOL
robertofully@fucape.br

Abstract

With the frequent increase in bankruptcy filings in Brazil, companies must rely on more accurate tools to assess liquidity. This article introduces the Restricted-Leveraged Quick Ratio (RLQR) as a new indicator designed to provide a more precise solvency analysis, especially for leveraged companies. The RLQR adjusts financial liabilities and interest expenses, excluding inventories, to reflect more accurately a company's capacity to cover its financial obligations. Based on data from 12 Brazilian companies listed on the B3 stock exchange, including two in judicial recovery, the RLQR proved more effective than traditional indicators, offering a high coefficient of determination (R^2) and robust statistical significance. Hence, RLQR is recommended as a preferred metric for liquidity analysis in challenging economic environments.

Keywords: Liquidity, Solvency, Leveraged Companies, Bankruptcy, LSRA, Financial Analysis, Liquidity Indicators.

Introduction

In 2024, Brazil witnessed a significant surge in judicial recovery filings (JR), underscoring a challenging economic scenario for many companies. Data from Serasa Experian showed a 71% increase in RJ filings in the first seven months of the year compared to the same period in 2023, totaling over a thousand cases (Serasa Experian, 2024).

This rise predominantly affects small and micro-enterprises, although large business groups have also felt the impact.The Brazilian Institute of Geography and Statistics (IBGE) highlights that the prolonged economic crisis, along with rising operational costs, has exacerbated financial difficulties for companies, especially those already struggling before the pandemic. Additionally, the Getulio Vargas Foundation (FGV) and the Brazilian Institute of Capital Markets emphasize that high debt levels and defaults are driving the growth in JR filings.

Many entrepreneurs struggle to balance their finances and meet obligations in a context of heightened economic uncertainty. The Federal Revenue Service (SRF) also points to Brazil's high tax burden and complex fiscal system as factors that negatively affect companies' ability to remain solvent, particularly in times of crisis. Information from commercial boards, like the Espírito Santo State Commercial Board, corroborates this scenario, showing that companies in judicial recovery have sharply increased from 2021 to 2023. Before 2021, the average stood at 4 JR cases per year; from 2021 to 2023, the average rose to 11 per year, an 84% increase.

Given this scenario, companies need to develop effective mechanisms to avoid bankruptcy and judicial recovery, ensuring their economic viability. Financial statements emerge as fundamental management tools, providing critical information for investors, creditors, and managers, aiding in strategic decision-making. In this context, the Restricted-Leveraged Quick Ratio (RLQR) is proposed as a new indicator to assess solvency and leverage levels of organizations.

RLQR adjusts financial liabilities and interest expenses to provide a more accurate analysis of a company's ability to cover its financial obligations with liquid assets, excluding inventories. It offers a detailed view of future solvency trends, helping predict the sustainability of companies in the coming years.

By comparing the RLQR with traditional quick ratio indicators, the proposal is to identify discrepancies that may signify potential financial difficulties and help predict companies financial sustainability for the following years. This index aims to address gaps in financial analysis by providing a more robust tool for managers and investors to assess the financial health of companies in a volatile economic environment.

Overview of Classic Liquidity Indicators

Below, several liquidity indicators commonly used by risk assessment agencies, the financial sector, banks, and academic institutions will be presented, along with their limitations.

Current Liquidity Ratio (CLR): The Current Liquidity Ratio (CLR) measures a company's ability to pay its short-term obligations with its current assets. According to Brigham and Ehrhardt (2016), this ratio is a fundamental indicator for assessing the short-term financial health of a company.

Mathematical Notation: (1)

$$CLR = CA/CL$$

Where CA = Current Assets, and CL = Current Liabilities

The CLR is widely used to assess whether a company has sufficient resources to cover its short-term debts. Many authors recommend its use for basic financial analysis (Brigham & Ehrhardt, 2016); however, critics like Bowlin (1963) argue that the CLR may be misleading as it includes inventories and receivables that may not easily turn into cash, masking the true liquidity situation of the company.

Quick Ratio (QR): The Quick Ratio (QR) is a more conservative measure as it excludes inventories, offering a stricter view of short-term payment capacity. As indicated by Purwanti (2022), the QR is useful for assessing liquidity without considering less liquid assets.

Mathematical Notation:

$$\mathrm{QR} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$$

This ratio is recommended for analyses that require a more conservative evaluation of a company's ability to meet its short-term obligations, avoiding the inclusion of assets that may not quickly convert to cash (Purwanti, 2022). However, Adnan and Kamran (2019) criticize the QR for still being insufficient in contexts of profitability or financial performance, which may include difficult-to-realize receivables.

Cash Liquidity Ratio (CLR): The Cash Liquidity Ratio (CLR) assesses a company's ability to pay short-term debts using only its most liquid assets, such as cash and cash equivalents. This ratio is frequently used for a conservative liquidity analysis, as highlighted by Vasiu et al. (2015).

Mathematical Notation:

$$\mathrm{CLR} = \frac{\text{Cash}}{\text{Current Liabilities}}$$

The CLR is suitable for evaluating immediate liquidity, providing a strict view of short-term payment capacity with highly liquid assets (Zago & Mello, 2015). Despite its utility, CLR is criticized for not adequately reflecting a company's financial situation, as ignoring other current assets could imply future liquidity loss, as pointed out by Hopp and Leite (1989).

General Liquidity Ratio (GLR): The General Liquidity Ratio (GLR) offers a broader view of a company's ability to pay its short and long term debts by considering assets and liabilities of varying durations. According to Pimentel and Lima (2011), the GLR is useful as a business continuity indicator, as it demonstrates a company's ability to liquidate financial commitments.

Mathematical Notation:

$$GLR = \frac{\text{Current Assets} + \text{Non-Current Assets}}{\text{Current Liabilities} + \text{Non-Current Liabilities}}$$

This ratio is recommended for evaluations that consider both short and long term obligations, providing a comprehensive view of a company's liquidity (Pimentel & Lima, 2011). Critics such as Hopp and Leite (1989) note that the GLR may not adequately reflect the liquidity of companies facing challenges in converting long-term realizable assets, possibly overestimating payment capacity.

Classic liquidity indicators, like the Current Liquidity Ratio (CLR), Quick Ratio (QR), Cash Liquidity Ratio (CLR), and General Liquidity Ratio (GLR), offer different perspectives on a company's ability to meet short and long term obligations. While the CLR is useful for assessing short-term liquidity, it may overstate liquidity by including less liquid items (Brigham & Ehrhardt, 2016). The QR, by excluding inventories, offers a more conservative view but still may not fully capture the reality of companies with large receivables (Hopp & Leite, 1989).

Meanwhile, the CLR focuses only on highly liquid assets, providing a strict but limited view of liquidity (Vasiu et al., 2015). The GLR provides a more comprehensive analysis, considering both short- and long-term assets and liabilities, but may fail to reflect the difficulty of converting long-term assets (Hopp & Leite, 1989).

Despite their utilities, these indicators present limitations that can affect their ability to provide a complete and accurate view of a company's solvency. Authors such as Hopp and Leite (1989) argue that the CLR can overestimate liquidity by including less liquid items. Similarly, the QR and CLR may not adequately account for liquidity variations generated by receivables and inventories, and cash availability may be overestimated due to third-party funding, which consequently can increase debt and reduce future liquidity. Lastly, the GLR may fail to reflect the real difficulty of converting long-term assets.

Proposal for the new restricted-leveraged quick ratio (RLQR)

These criticisms highlight the need for improvements in existing indicators and the potential inclusion of more conservative metrics. In this context, the introduction of the Restricted-Leveraged Quick Ratio (RLQR) offers a more assertive evaluation of companies' liquidity, especially those with high debt levels.

RLQR aims to overcome the limitations of traditional indicators by providing a more adjusted view of a company's ability to cover its financial liabilities with liquid assets, excluding inventories and adjusting financial liabilities and interest expenses. The formula aims to reflect future solvency more accurately and capture potential liquidity loss, a critical indicator for working capital management (Molina Queiroz et al., 2022).

The inclusion of the debt service cost percentage in the denominator is a distinctive feature of RLQR. It reflects the financial impact of debt and interest service that a company must bear.

This article's purpose is to present and evaluate the Restricted-Leveraged Quick Ratio Index (RLQR), a new indicator with the purpose of offering a more accurate analysis regarding

companies solvency, highlighting the ones in debt. The RLQR also attempts to overcome the classical liquidity indicators; offering like that, a more conservative perspective that has the capability to adjust itself to a company's capacity of covering financial liabilities with liquid assets. The proposed formula is:

$$RLQR = [CA - I]/[TFL + (\%DS)]$$

Where:

- **Current Assets:** Total assets that can be converted into cash within a short period, typically one year.
- **Inventory:** The value of inventories excluded to provide a more conservative liquidity assessment.
- **Total Financial Liabilities:** The total financial obligations of the company, including both short- and long-term liabilities.
- **Debt Service:** A percentage that represents the total debt service cost, calculated as follows:

$$\text{Debt Service} = \left(\frac{\text{Financial Expenses}}{\text{Total Financial Liabilities}}\right) \times 100$$

The inclusion of the debt service cost percentage in the denominator is a distinctive feature of RLQR. It reflects the financial impact of debt and interest service that a company must bear. Financial leverage, which describes the capital structure involving equity and third-party capital, directly influences the company's profitability.

When a company has a high degree of leverage, the pressure on profitability increases due to high financial expenses, which can negatively impact its financial performance (Modigliani & Miller, 1958). This impact is reflected in both the Cost of Capital (COC) and the General Debt Level (GDL) of the company, affecting its ability to generate value and maintain solvency.

Traditional indicators, such as the Current Liquidity Ratio (CLR) and the Quick Liquidity Ratio (QLR), have their limitations by not adequately considering the cost of debt and financial leverage. Brigham and Ehrhardt (2016) highlight that the CLR can overestimate liquidity by including less liquid items, while Higgins (2012) points out that the QLR and CLR may not fully reflect variations in liquidity caused by accounts receivable and inventory. The RLQR, by adjusting for financial liabilities and interest expenses, offers a more comprehensive view of a company's ability to manage its financial obligations in relation to its liquid assets.

Evaluating the RLQR by industry sector is essential to adapt the indicator to the specific characteristics of each segment. Different sectors exhibit significant variability in terms of liquidity and capital structure, which can influence the interpretation of the RLQR. Scott (2015) emphasizes that sectoral analysis allows for a more precise and relevant evaluation of solvency, adjusting the indicator to reflect the particularities of each sector and offering clearer insights into the financial health of companies.

Methodology

The sample consists of Brazilian companies listed on the Brazil Bolsa Balcão (B3) between 2013 and 2023. Years prior to 2010 were excluded due to changes in the accounting model, which shifted to international standards with the adoption of International Financial Reporting Standards (IFRS). Multivariate statistical analysis techniques were used with the help of the STATA software.

This study used data from 12 companies listed on the B3. The selected companies are predominantly Brazilian retailers chosen due to their leveraged status, with some undergoing judicial recovery. These companies belong to the following sectors: cyclical consumption, focusing on the trade sub-sector; industrial goods, specifically in the machinery and equipment sub-sector; non-cyclical consumption, in the trade and distribution sub-sector; and basic materials, including chemicals, wood, and paper sub-sectors.

For the validation of the proposed new indicator, detailed analysis was conducted on the data from these companies (Table 1). In this table, companies where the variable "RJ" equals 1 are in judicial recovery, while the others are not.

TABLE 1 - SAMPLE OF COMPANIES FOR APPLICABILITY TESTING

EMPRESA	Ano	RJ	REG	ILG	ILC	ILS	ILI	ILSRA (Novo)
AMER	2013	1	4	2,59	1,62	1,19	0,73	1,11
AMER	2014	1	4	2,46	1,30	0,86	0,49	0,75
AMER	2015	1	4	3,05	1,60	1,17	0,79	1,07
AMER	2016	1	4	3,28	1,58	1,09	0,63	0,89
AMER	2017	1	4	3,41	1,88	1,56	1,21	1,36
AMER	2018	1	4	4,06	2,19	1,92	1,57	1,71
AMER	2019	1	4	3,33	1,95	1,76	1,34	1,55
AMER	2020	1	4	4,24	2,96	2,64	2,07	2,46
AMER	2021	1	4	0,87	0,48	0,36	0,16	0,33
AMER	2022	1	4	0,63	0,34	0,27	0,12	0,23
AMER	2023	1	4	-	-	-	-	-
BRKM3	2014	0	5	3,51	1,05	0,65	0,29	0,59
BRKM3	2015	0	5	3,44	1,03	0,68	0,42	0,65
BRKM3	2016	0	5	2,25	0,71	0,48	0,34	0,45
BRKM3	2017	0	5	2,79	0,94	0,58	0,32	0,55
BRKM3	2018	0	5	2,56	0,93	0,56	0,34	0,53
BRKM3	2019	0	5	4,20	1,44	0,97	0,52	0,92

BRKM3	2020	0	5	3,03	1,20	0,91	0,62	0,86
BRKM3	2021	0	5	3,67	1,56	0,91	0,48	0,86
BRKM3	2022	0	5	3,64	1,42	0,84	0,61	0,79
BRKM3	2023	0	5	3,75	1,53	1,02	0,78	0,95
ESPA	2016	0	5	4,03	1,08	1,08	0,35	1,08
ESPA	2017	0	5	3,03	1,11	1,11	0,14	1,10
ESPA	2018	0	5	2,39	1,03	1,03	0,21	0,97
ESPA	2019	0	5	2,67	1,07	1,07	0,13	0,96
ESPA	2020	0	5	2,26	1,30	1,30	0,25	1,16
ESPA	2021	0	5	2,90	1,13	1,13	0,19	1,07
ESPA	2022	0	5	4,14	1,74	1,73	0,42	1,55
ESPA	2023	0	5	2,40	1,00	1,00	0,17	0,87
LJQQ	2017	0	5	1,61	1,09	0,66	0,13	0,56
LJQQ	2018	0	5	2,05	1,59	1,21	0,32	1,12
LJQQ	2019	0	5	2,32	1,63	1,31	0,38	1,22
LJQQ	2020	0	5	2,27	1,64	1,31	0,52	1,23
LJQQ	2021	0	5	2,39	1,62	1,21	0,30	1,12
LJQQ	2022	0	5	2,82	1,89	1,45	0,46	1,32
LJQQ	2023	0	5	2,53	1,70	1,33	0,41	1,21
LREN3	2014	0	5	2,61	1,72	1,42	0,41	1,33
LREN3	2015	0	5	2,53	1,60	1,34	0,32	1,24
LREN3	2016	0	5	2,22	1,40	1,13	0,31	1,06
LREN3	2017	0	5	2,57	1,67	1,35	0,39	1,27
LREN3	2018	0	5	2,04	1,37	1,11	0,32	1,07
LREN3	2019	0	5	2,42	1,40	1,16	0,29	1,10
LREN3	2020	0	5	2,60	1,58	1,33	0,47	1,28
LREN3	2021	0	5	2,69	1,76	1,56	0,75	1,47
LREN3	2022	0	5	3,02	1,86	1,60	0,50	1,45
LREN3	2023	0	5	2,73	1,63	1,39	0,41	1,28
MGLU3	2014	0	5	1,87	1,20	0,68	0,30	0,61
MGLU3	2015	0	5	1,91	1,17	0,70	0,39	0,61
MGLU3	2016	0	5	1,66	1,07	0,63	0,39	0,55

MGLU3	2017	0	5	1,79	1,27	0,80	0,40	0,65
MGLU3	2018	0	5	1,63	1,19	0,67	0,19	0,60
MGLU3	2019	0	5	2,47	1,60	1,13	0,59	1,06
MGLU3	2020	0	5	1,84	1,25	0,81	0,22	0,77
MGLU3	2021	0	5	2,52	1,61	1,01	0,27	0,97
MGLU3	2022	0	5	2,55	1,48	0,95	0,18	0,86
MGLU3	2023	0	5	2,15	1,16	0,73	0,19	0,65
PCAR3	2014	0	4	1,89	1,00	0,65	0,46	0,61
PCAR3	2015	0	4	1,87	0,99	0,63	0,44	0,58
PCAR3	2016	0	4	1,64	1,15	0,98	0,19	0,87
PCAR3	2017	0	4	1,67	1,11	0,96	0,11	0,92
PCAR3	2018	0	4	1,65	1,09	0,93	0,12	0,85
PCAR3	2019	0	4	2,53	0,86	0,49	0,34	0,47
PCAR3	2020	0	4	2,88	0,95	0,60	0,47	0,56
PCAR3	2021	0	4	2,99	1,08	0,76	0,50	0,73
PCAR3	2022	0	4	2,47	1,61	1,49	0,21	1,33
PCAR3	2023	0	4	3,54	1,21	0,89	0,60	0,79
PETZ	2017	0	5	2,67	1,49	0,94	0,41	0,89
PETZ	2018	0	5	2,81	1,65	1,20	0,76	1,13
PETZ	2019	0	5	3,26	1,16	0,81	0,44	0,76
PETZ	2020	0	5	2,89	1,35	1,07	0,75	1,01
PETZ	2021	0	5	4,93	1,95	1,47	0,98	1,37
PETZ	2022	0	5	4,95	1,48	0,90	0,25	0,82
PETZ	2023	0	5	5,26	1,81	1,23	0,56	1,13
SBFG	2015	0	4	1,26	0,67	0,42	0,14	0,37
SBFG	2016	0	4	1,55	0,66	0,33	0,15	0,27
SBFG	2017	0	4	1,87	0,84	0,48	0,17	0,42
SBFG	2018	0	4	1,93	0,88	0,52	0,26	0,47
SBFG	2019	0	4	3,60	1,43	1,04	0,10	0,95
SBFG	2020	0	4	3,24	1,77	1,29	0,28	1,21
SBFG	2021	0	4	3,31	1,67	1,19	0,25	1,11
SBFG	2022	0	4	2,87	1,54	0,95	0,14	0,86

SBFG	2023	0	4	3,03	1,65	1,05	0,31	0,95
SLED3	2013	1	0	2,41	1,73	0,81	0,04	0,76
SLED3	2014	1	0	1,78	1,37	0,84	0,26	0,77
SLED3	2015	1	0	1,76	1,39	1,10	0,19	0,87
SLED3	2016	1	0	1,98	1,47	1,03	0,19	0,91
SLED3	2017	1	0	1,89	1,30	0,68	0,09	0,63
SLED3	2018	1	0	1,22	0,60	0,39	0,12	0,35
SLED3	2019	1	0	3,23	0,89	0,50	0,08	0,46
SLED3	2020	1	0	1,56	0,68	0,47	0,13	0,44
SLED3	2021	1	0	1,46	0,50	0,39	0,05	0,36
SLED3	2022	1	0	0,73	0,21	0,10	0,01	0,08
SUZB3	2014	0	3	9,17	2,15	1,80	1,05	1,68
SUZB3	2015	0	3	8,05	1,88	1,50	0,70	1,39
SUZB3	2016	0	3	7,68	2,10	1,75	0,96	1,64
SUZB3	2017	0	3	7,69	1,83	1,51	0,73	1,39
SUZB3	2018	0	3	8,90	5,08	4,78	4,21	4,64
SUZB3	2019	0	3	8,53	1,65	1,24	0,82	1,18
SUZB3	2020	0	3	12,46	2,20	1,71	1,11	1,64
SUZB3	2021	0	3	10,30	2,95	2,55	1,83	2,44
SUZB3	2022	0	3	9,19	2,56	2,17	1,18	2,06
SUZB3	2023	0	3	9,71	2,61	2,20	1,43	2,10
WEGE3	2014	0	5	3,51	2,39	1,88	1,23	1,80
WEGE3	2015	0	5	4,08	2,74	2,17	1,27	2,08
WEGE3	2016	0	5	4,11	2,78	2,30	1,45	2,17
WEGE3	2017	0	5	3,23	2,18	1,75	1,06	1,63
WEGE3	2018	0	5	3,06	1,87	1,39	0,70	1,31
WEGE3	2019	0	5	3,49	2,17	1,55	0,75	1,45
WEGE3	2020	0	5	3,39	2,13	1,50	0,76	1,44
WEGE3	2021	0	5	3,02	2,01	1,19	0,41	1,16
WEGE3	2022	0	5	2,74	1,91	1,17	0,49	1,15
WEGE3	2023	0	5	2,81	1,92	1,29	0,63	1,23

To verify the collected data, we gathered balance sheet and income statement information for these companies from 2013 to 2023; based on the previous mathematical notations, we calculated the classic liquidity indices. Two groups of variables were selected to test the correlation and significance of the new indicator, comparing it to traditional versions. These groups are: cash variables and financial performance variables.

Table 2 presents the results of a multiple linear regression model applied to analyze the relationship between explanatory cash variables and different liquidity indices. The analyses were conducted using Stata 18 software, which enabled the assessment of the impact of variables such as Regulation, Working Capital Variation (WCV), Working Capital Investment Level (WCIL), Treasury Balance, "Scissor Effect," and Debt on EBITDA on five different liquidity indices: GLR, QR, CLR, CLR, and the new RLQR.

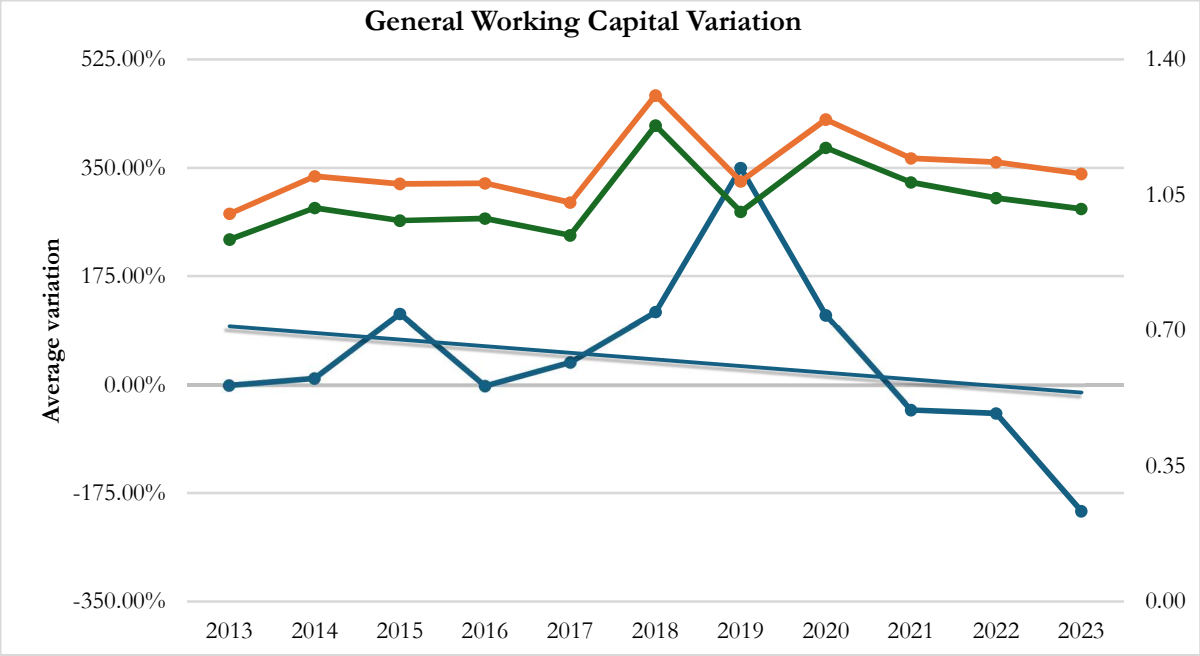
Each column of the table corresponds to one of the liquidity indices analyzed, while the rows present the estimated coefficients for each explanatory variable, along with the respective p-value. These p-values indicate the statistical significance of the variables, with asterisks denoting significance levels: *** for p-value < 1%, ** for p-value < 5%, and * for p-value < 10%.

TABLE 2 - MULTIPLE LINEAR REGRESSION MODEL WITH LIQUIDITY-CASH VARIABLES

	GLR	**QR**	**Current LR**	**Cash LR**	**RLQR**
Variable					
Regulation	-1.802.989	-.0334176	.0347058	.0021997	-.0346728
	***0.000	0.655	0.697	0.977	0.630
Working Capital Variation	.1157539	.0207819	.0451708	.0525607	.024001
	0.313	0.265	***0.046	***0.008	0.183
WCIL	.1732131	.1453494	.1662403	.0353304	.1388477
	0.507	***0.001	***0.002	0.412	***0.001
Treasury Balance	.5758016	.1335639	.1002217	.2676738	.1310543
	*0.069	***0.011	*0.100	***0.000	***0.010
Scissor Effect	-.4302802	-.1897486	-.1236231	-.2089969	-.1764404
	*0.077	***0.000	***0.010	***0.000	***0.000
Debt x EBITDA	-.6012363	-.1550936	-.1706109	.0089334	-.2047536
	0.356	0.146	0.178	0.933	***0.049
Observations:	44	44	44	44	44
R^2	**0.5904**	**0.7177**	**0.6127**	**0.7213**	**0.7218**

Significance level: ***p-value < 1%, **p-value < 5%, *p-value < 10%.
Source: Authors' elaboration.

The following graph, "Working Capital Variation (CDG) - General," shows the relationship between the average variation in Working Capital (CDG) of all analyzed companies and the Quick Ratio (QR) and Restricted-Leveraged Quick Ratio (LSRA) from 2013 to 2023. The blue line in the graph represents the average CDG variation, which exhibited significant volatility, peaking in 2019 and sharply declining in 2023, indicating the instability of companies' working capital during the following years.
The orange and dark green lines represent the averages of the QR and LSRA indices, respectively, showing a more stable trend compared to the CDG, although with minor fluctuations. The QR reached its highest point in 2017, while the LSRA followed a similar pattern but with slightly lower values in most years. The graph highlights the importance of understanding how variations in CDG impact companies' liquidity, with the LSRA providing a more conservative and adjusted view during periods of higher financial volatility.



Source: Author's elaboration.

Table 3 presents the results of a multiple linear regression model with 112 observations, analyzing the relationship between financial performance variables, such as % ROA, % ROE, % EBITDA, and different liquidity indices. The independent variables include factors like Indebtedness > 1.5, Judicial Recovery, and Costly Indebtedness, with the explanatory capacity of the models assessed through the coefficient of determination (R^2).
Each column in the table corresponds to one of the liquidity indices analyzed, while the rows show the estimated coefficients for each explanatory variable, accompanied by their respective p-values. These p-values indicate the statistical significance of the variables, with asterisks denoting significance levels: * for p-value < 1%, ** for p-value < 5%, and * for p-value < 10%.

TABLE 3 - MULTIPLE LINEAR REGRESSION MODEL WITH LIQUIDITY-PERFORMANCE VARIABLES

	ILG	**ILS**	**ILC**	**ILI**	**ILSRA**
Variable					
Debt > 15%	.1248868	-.138447	-.1472435	-.0900893	-.1537977
	0.723	**0.227**	**0.252**	**0.395**	**0.160**
Judicial Recovery	-1268144	-.1007911	-.0933554	.1000816	-.134772
	***0.010	**0.522**	**0.597**	**0.492**	**0.370**
% ROA	-.1493248	-.0395984	-.032734	-.0285523	-.038124
	***0.000	***0.000	***0.000	***0.000	***0.000
% ROE	-.002982	-.0015495	-.0017339	-.0009021	-.0014543
	0.138	***0.018	***0.019	**0.135**	***0.020
% ROIC	.0081052	.0099291	.011317	.0083344	.0092115
	0.557	***0.028	***0.026	***0.046	***0.033
% Net Profit	-.0336314	.0053497	.0085043	-.0000766	.0048329
	***0.025	**0.268**	**0.117**	**0.986**	**0.294**
% EBITDA	.1422146	.0280379	.0203436	.0237783	.0272411
	***0.000	***0.000	***0.002	***0.000	***0.000
Costly Debt	.6901855	.2436219	.2888624	.2381379	.2267794
	***0.025	***0.015	***0.010	***0.010	***0.018
N.Obs:	**112**	**112**	**112**	**112**	**112**
R^2	**0.4489**	**0.2266**	**0.6127**	**0.2109**	**0.3084**

Significance level: ***p-value < 1%, ** p-value < 5%, * p-value < 10%. Source: Authors' elaboration.

Results

The results in Table 2 indicate that the RLQR shows the highest coefficient of determination ($R^2 = 0.7218$), suggesting that this model explains 72.18% of the variation in liquidity in the cash variables, which is higher than the other indices evaluated. This high R^2 demonstrates that the RLQR has a slightly better explanatory capacity compared to the other indices.

Moreover, the independent variables in the RLQR model exhibit robust statistical significance. For example, the variable "WCIL" has a p-value of 0.001 and "Treasury Balance" has a p-value of 0.010, both of which are highly significant, indicating a strong and reliable relationship with the RLQR. In comparison, the GLR, for example, shows a

Regulation coefficient with high significance (p-value = 0.000), but its R^2 of 0.5904 indicates lower explanatory power than the RLQR.

The RLQR model also highlights the importance of the variable "Scissor Effect," which is significant in all models but presents an extremely low p-value (0.000) in the RLQR, indicating a very strong correlation. This suggests that companies with stricter control over operating margins and the impact of fixed costs have better liquidity conditions when adjusted by the variables considered in the RLQR.

Table 3 presents the results of the linear regression models, highlighting the most significant performance variables for each liquidity index.

ARQLI (Adjusted Restricted Quick Liquidity Index): The ARQLI shows an R^2 of 0.3084, indicating that the model explains 30.84% of the variation in liquidity-performance, a modest value but noteworthy compared to CLR (R^2 = 0.2109) and QR (R^2 = 0.2266). Variables such as % ROA (p-value = 0.000), % ROE (p-value = 0.020), % EBITDA (p-value = 0.000), and Interest-bearing Debt (p-value = 0.018) demonstrate high statistical significance, indicating a strong relationship with the ARQLI. The negative coefficient of % ROA (-0.038124) suggests that higher asset profitability is associated with a lower ARQLI, which is expected in scenarios where liquidity is more conservative.

GLI (General Liquidity Index): Although the GLI has the highest R^2 (0.4489) among the indices, it is heavily influenced by the Judicial Recovery variable (coefficient = -1,268,144, p-value = 0.010), which may indicate exaggerated sensitivity to extreme situations. Other significant variables include % ROA (p-value = 0.000) and % EBITDA (p-value = 0.000), showing a good relationship with operational performance, but with elevated sensitivity that could distort interpretation.

GLI (Quick Liquidity Index): The GLI has a lower R^2 (0.2266), indicating less explanatory power compared to General LI and ARQLI. Variables such as % ROA (p-value = 0.000), % ROIC (p-value = 0.028), and % EBITDA (p-value = 0.000) are statistically significant, but the lower R^2 suggests that the GLI may not adequately capture the nuances of liquidity-performance.

The CLR, with an R^2 of 0.6127, shows good explanatory power but is strongly influenced by variables such as % ROA (p-value = 0.000) and % EBITDA (p-value = 0.002). However, the sensitivity to net income variations and debt may be a point of concern, indicating a possible overvaluation of these variables' effects on liquidity.

Discussion and Final Considerations

The comparative analysis conducted through linear regression demonstrates that the RLQR (Restricted-Leveraged Quick Ratio) is the best liquidity indicator among those evaluated. It presents a combination of high explanatory power (higher R^2) and statistical significance of the explanatory variables. As such, the RLQR should be considered a preferred metric for assessing a company's liquidity, especially when precision and robustness in financial analysis are crucial.

While the RLQR does not have the highest R^2 overall, it offers a balanced model with good statistical significance in the explanatory variables, particularly concerning financial

performance (% ROA, % ROE, % EBITDA). It stands out as a robust liquidity-performance indicator, capable of capturing more precisely the liquidity variations associated with operational performance. Therefore, the RLQR should be considered an effective tool for financial analysis, especially in scenarios where precision in evaluating liquidity adjusted for performance is critical.

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