Determinants of Insurance Company Profitability: An Analysis of Latin America

Abstract

This study analyzed performance on insurance companies in Argentina, Brazil, Chile, and Colombia through financial indicators such as Return on Assets (ROA), Return on Equity (ROE), and Return on Investments (ROI) during the Covid-19 pandemic. The literature shows that economic crises directly impact insurers' profitability and emphasize the importance of structural factors, such as size, liquidity, and leverage, for their resilience. Panel data regression models with robust residuals to homoscedasticity were used, considering endogenous and exogenous macroeconomic variables. The study analyzed data from insurers in these countries between 2017 and 2023. Results indicate that Covid-19 affected profitability on Brazilian and Argentine insurers, with Argentina being more sensitive to macroeconomic conditions. In Colombia, high leverage was a key factor. Meanwhile, Brazil and Chile showed greater stability despite challenges related to loss ratios and investment returns. These findings reinforce discussions on the resilience of the insurance sector in Latin America.

Keywords: Determinants; Profitability; Pandemic; Latin America.

1. Introduction

Ewold (1991) proposes an approach to insurance, highlighting mainly two concepts. The first concept highlights that insurance can be designated by the set of insurance institutions or by the insurance market. In turn, the second emphasizes that insurance is an abstract science, since it, by nature, takes a different form within each institution, depending on the purpose of contracted protection. Both concepts converge with the understanding of insurance as a risk technology, since the objective of these institutions is to find solutions to this abstract problem. Risk, in turn, has three characteristics that allow the application of this technology: it is measurable, collective and a measure of capital. These characteristics allow individuals and companies to protect their assets through an insurance institution.

By providing protective products to the public, the insurer not only retains the risk of losses for its policyholders but also holds the responsibility before regulatory bodies to ensure that possible economic shocks will not affect the continuity of its operations. In this context, the group of insurance institutions, also denoted by the insurance market, has the role of

maintaining the stability of financial markets and serving as a symbol of resilience for sectors of the economy (Akotey, Sackey, Amoah e Manso, 2013).

As with other firms that are part of an economy, insurance companies seek to maximize their profits. In markets close to the insurer, such as the financial market, studies have been conducted to assess the relationship between internal and external factors and the profitability of the banks analyzed, seeking to understand the impacts of each of these factors. Initially, this relationship was studied for developed countries (Heggestad e Mingo, 1976) and later the analyses were expanded to developing or underdeveloped countries (Alper e Anbar, 2011).

For the insurance market, in general, profit is calculated by the difference between the premiums retained and the total claims paid for the policies in the insurer's client portfolio. According to Camino-Mogro & Bermúdez-Barrezueta (2019), the profitability of insurance companies is directly related to the microeconomic and macroeconomic conditions applied to them. While microeconomic variables are linked to factors that are intrinsic to the insurance activity, such as premiums issued, reserves and liquidity, macroeconomic factors are variables external to the insurance activity. Examples include interest rates, inflation and population growth.

More specifically, among the empirical efforts, the attractiveness of insurance companies to investors was initially studied through their profitability potential indicators (Pfeffer, 1965). Later, studies such as those by Shiu (2004) investigated the determinants of profitability for companies in the United Kingdom and finally this scope ended up being expanded to underdeveloped countries (Akotey et al., 2013; Malik, 2011 and Lee, 2014).

As in other underdeveloped and developing countries, the profitability of insurance institutions in Latin America began to be the result of scientific research in the early 2000s. This movement accompanied the growth of the insurance sector during this period, which was mainly due to two factors that impacted Latin American countries: the first was the privatization of part of the insurance market, with an emphasis on replacing state pensions with individual capitalization schemes (Masci, Tejerina e Webb, 2007). Seeking to deepen the capital market and facilitate private investment, this movement began in Chile in 1981, followed by countries such as Peru in 1993, Argentina and Colombia in 1994 and Mexico in 1997. In turn, the second factor was the opening of financial markets. With the aim of capturing greater foreign investment, specifically for the insurance market, foreign investment brought capital and knowledge through new and more sophisticated products. Thus, as early as 2004, a strong

presence of foreign-controlled companies could be seen in Latin America, with them covering a market share that varied between 35% and 70% (Masci et al., 2007).

The growth of the middle class, the increase in disposable income (World Bank. 2021) and a greater awareness of the importance of risk management have allowed the insurance sector in Latin America to develop to new levels. With the arrival of new consumer needs of companies and individuals, new types of risk have become necessary. Cyber risk, for example, was a topic of discussion among insurers (Camillo, 2017), highlighting the need for a process of digitalization and the use of new technologies to ensure that recent demands can be met.

More recently, the COVID-19 pandemic ravaged nations around the world between early 2020 and mid-2022. The spread of the coronavirus significantly surpassed the 2009 pH1N1 pandemic, not only in number of cases, but also in the distribution of deaths caused by the virus, while pH1N1 had a mortality rate of 0.15% to 0.25%, COVID-19 had a rate of 2.7% (da Costa, Saivish, Santos, de Lima & Moreli, 2020). This scenario had a direct impact on the insurance market, directly and indirectly affecting insurers, as while the rate of claims and cancellations among insurers increased, the imposition of quarantine and social distancing affected their operations, forcing a change to home-based models.

In this scenario, the growth of the Latin American insurance market has been going through antagonistic moments in recent years. While in 2019 it was possible to see a growth of 1.6% in the total premiums collected, reaching a level of 153 billion dollars, compared to a previous drop of 5.5% in 2018 (MAPFRE Economics, 2020), the year 2020 was marked by the COVID-19 pandemic. This caused a profound shock, leading to an 11.9% drop in premiums collected compared to the previous year, surpassing the 7% drop in the economy of the same group of countries (MAPFRE Economics, 2021).

Given this scenario, there is a gap in literature when analyzing the post-pandemic scenario in Latin America. In this sense, the study seeks to evaluate how profitability was impacted during the Covid-19 pandemic in insurance companies in 4 Latin American countries, namely Brazil, Argentina, Chile and Colombia. Therefore, the central research question of the work is:

Can it be said that the COVID-19 pandemic caused any change in the behavior of the profitability determinants of insurers in Latin American countries? And how was each of the

determinants affected? How did the pandemic affect each country? What are the specificities of each economy?

This paper is structured as follows: initially, we address the empirical literature that analyzes the impacts of the Covid-19 pandemic on the profitability of insurance companies around the world. Then, we present the panel data regression model that was used to estimate the profitability behavior of insurance companies in each country in the face of the Covid-19 pandemic. To this end, we include control variables that are internal and external to the insurance activity. Finally, we present the results, as well as the final considerations.

2. Theoretical Foundation and Empirical Literature:

2.1. Determinants of profitability in the financial market

The study of profitability determinants had its roots in the banking market, with works such as those by Heggestad e Mingo (1976) and Short (1979), who related internal and external factors to banking operations with the profitability performance of banks in developed countries. Due to the relevance of the topic, other studies have expanded their scope to underdeveloped or developing countries (Alper & Anbar, 2011; Athanasoglou et al., 2008; Munyambonera, 2013), as well as to the insurance market (Burca e Batrinca, 2014; Chugh et al., 1987; Pavic Kramaric et al., 2017; Shiu, 2004).

According to Heggestad & Mingo (1976), there is a relationship between market concentration (monopoly) and the prices or services of commercial banks. The study also warns of the need for regulatory bodies to position themselves in the face of possible mergers in relatively oligopolistic or monopolized markets, since this merger could negatively impact the banking performance of these financial markets. According to Short (1979), a significant change in market concentration would be necessary to negatively impact the profitability of commercial banks; in addition, the author comments that slight changes in lending or deposit rates could lead to significant changes in the profitability of banks.

For Alper e Anbar (2011), banks with the highest market value had the highest profitability indexes, such as *Return on Assets* (ROA) and *Return on Equity* (ROE). However, contrary to expectations, the authors found a negative relationship between total loan indexes and ROA, even though the tendency was for banks to generate the highest income from this source. In parallel, for Athanasoglou et al. (2008), the improvement in profitability indexes in

the banking sector would be directly linked to the strengthening of credit and capital risk management standards, as well as operational efficiency.

2.2. Determinants of profitability in the insurance market.

The analysis of determinants has also been extended to the insurance market in developed countries (Burca e Batrinca, 2014; Chugh et al., 1987; Pavic Kramaric et al., 2017; Shiu, 2004). According to Chugh et al. (1987), the underwriting profit of property and casualty insurers in the United States is directly related to market and operational factors. As for the first type, we can mention the national market share, regional market share, absolute and relative size of the group, and the structural cost of the group in relation to the structural cost of the market and other larger groups in the same industry. In turn, in relation to operational factors, the authors cite the degree of market and product focus, growth rate, underwriting cash flow, and underwriting exposure rate as essential elements. Additionally, the study found evidence that high degrees of market focus tend to have positive impacts on underwriting results, while conversely, the growth rate tends to increase the combined loss and gain ratio, decreasing the insurer's profitability.

The factors that impacted the performance of UK insurers were also analyzed (Shiu, 2004). The author observed that variables such as liquidity, unexpected inflation, interest rate level and underwriting profits are statistically significant determinants of the performance of British insurers.

2.3. Determinants of profitability in the insurance market of underdeveloped countries.

Recently, a study was also carried out on the determinants of profitability for the insurance sector in underdeveloped countries in regions such as Africa (Akotey et al., 2013), Latin America (Camino-Mogro e Bermúdez-Barrezueta, 2019) and Asia (Lee, 2014; Malik, 2011), seeking to find the variables that would explain the particularities of each country.

Akotey et al. (2013) indicate that the average profitability of Ghanaian life and non-life insurers is given by the sum of *Return on Investment* (ROI) and underwriting profit. Analyzing both profitability indicators, the study shows that gross premium and total assets have a negative effect on profitability, highlighting that this can be explained by excessive attention to marketing to increase gross premium, without proper allocation of resources for managing investment portfolios.

Camino-Mogro & Bermúdez-Barrezueta (2019) studied three profitability indicators for Ecuadorian insurance firms in the life and non-life segments, namely ROA, ROI and net profit. In general, the authors reached the following conclusions regarding the microeconomic variables: gross premium has a positive impact on ROA and net profit; technical provisions negatively impact ROA but positively impact net profit and ROI; liquidity positively impacts ROI and net profit. In turn, regarding the macroeconomic determinants, the authors comment that the HHI (Herfindahl–Hirschman Index that measures the market concentration of insurers) positively affected the three profitability variables, indicating that larger insurers could have greater opportunities to increase their profitability according to their market power.

In turn, Lee (2014) indicates that for the Taiwanese property insurance market, low levels of underwriting risk, use of reinsurance and input costs produce positive impacts on the firm's profitability. Insurers that operate below financial holdings do not necessarily have higher profits. According to the author, this is due to the group's discretionary expenses.

In turn, Malik (2011) relates the determinants of profitability of Pakistani insurance firms with ROA, finding a positive relationship between profitability, firm size and capital volume. Additionally, the researcher found a negative relationship between ROA, leverage ratio and loss ratio. Similarly, Atsbeha & Kaur, (2017) analyze from the same perspective the determinants of profitability of the Ethiopian insurance sector, finding significant relationships between ROA and insurer size, capital adequacy ratio, liquidity ratio and GDP growth rate.

2.4. The impacts of COVID-19 on insurance market profitability.

More specifically, the influence that the pandemic period had on the profitability of insurance companies has been studied worldwide. According to Farooq, Nasir, Bilal & Quddoos (2021), the pandemic period had a strong impact on the abnormal returns of 958 insurance companies' shares. In addition, the authors highlight that after the first case of COVID-19 registered in the country, companies in emerging economies such as Brazil and Indonesia registered an intense shock in a shorter time window due to their volatile nature and the spillover effect.

In turn, Puławska (2021) studied the effects of the Covid-19 pandemic on European insurance markets, analyzing the period from 2010 to 2020. The results show that the pandemic negatively affected the average ROA of German and Italian companies, as well as the solvency ratio decreased in the insurance sectors of Belgium, France and Germany. The study also indicates that there was no significant impact due to the pandemic on the Polish insurance

sector, unlike in other countries. In addition, the importance of the study for regulatory bodies is highlighted, as evidence of a decrease in solvency ratios may demonstrate a problem in the future for the insurance markets of these countries.

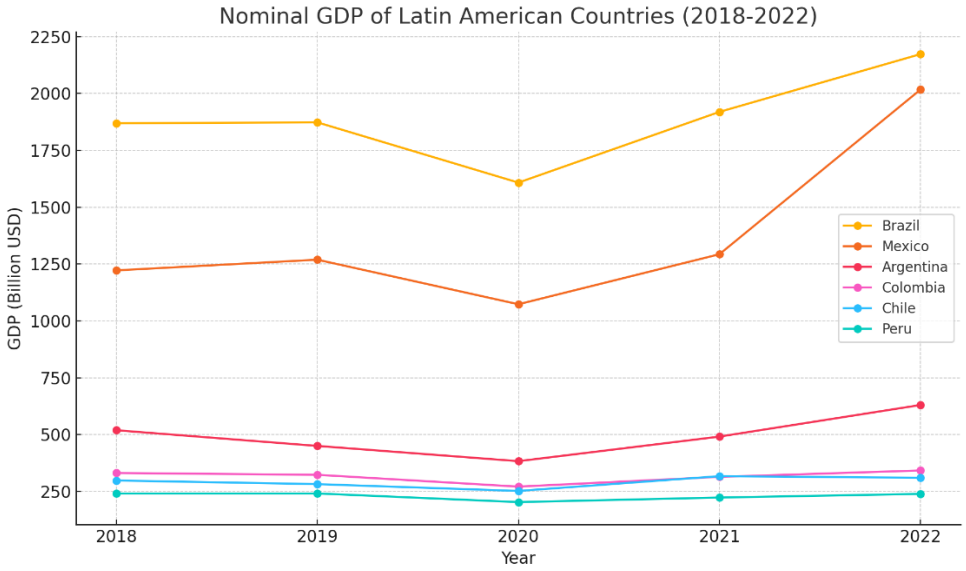
Finally, Haque, Mohona, Sultana & Kulsum (2021) analyzed the period from 2018 to 2021 to find impacts on the Bangladesh insurance market. The study shows that when comparing pandemic and non-pandemic periods, there was a significant contraction in the insurance sector, with short-term impacts on premium growth, insurance density, and insurance penetration. Similarly, Thilakarathna & Fernando (2022) studied the effect of the Covid-19 pandemic on the profitability of Sri Lankan insurance companies, using 10 insurance companies listed on the Colombo Stock Exchange in the period from 2018 to 2021. The study points out that the total number of confirmed Covid-19 cases impacts the average ROA of the Sri Lankan insurance market, as well as other variables already discussed previously, such as premium growth, solvency ratio, firm size, and reinsurance dependence.

3. Methodological Procedures

The advance of the pandemic in Latin America has raised questions related to the performance of insurance companies operating in the region. Generally, public and private health systems in all countries in the region have been impacted due to the increase in cases and hospitalizations (Benítez, Velasco, Sequeira, Henríquez, Menezes & Paolucci, 2020). In addition, while Life insurers have suffered an increase in claims due to the increase in deaths caused by Covid-19, in the case of non-life insurers, there has been an increase in plan cancellation rates due to the financial conditions of the population, which have been negatively impacted by the restrictive measures adopted by the governments of Latin American countries. In this context, this paper will seek to study the relationship between the pandemic and the determinants of profitability of insurance companies in Latin America, based on the performance variables ROA, ROE and ROI.

Based on this premise, the variation in GDP of Latin American countries from 2018 to 2022 was initially analyzed. Figure 1 shows this dynamic and makes it possible to visualize the largest Latin American economies in terms of GDP.

Figure 1. GDP by country in Latin America



Source: authors' elaboration based on data available from the World Bank

Based on Figure 1, it was possible to choose the four economies that would be the object of study: Brazil, Argentina, Colombia and Chile. With this, the collection of data from insurance companies in these countries was started. For the endogenous variables related to the insurance activity, data from the regulatory bodies of each country were accessed, which are: *Superintendência de Seguros Privados* - Susep (Brazil), *Superintendencia de Seguros de la Nación* - SSN (Argentina), *Comisión para el Mercado Financiero* - CMF (Chile) and *Unidad de Proyección Normativa y Estudios de Regulación Financiera* - URF (Colombia).

In turn, data related to macroeconomic variables were collected from bodies such as *Instituto Brasileiro de Geografia e Estatística* – IBGE and Banco Central do Brasil – BCB (Brazil), *Instituto Nacional de Estadísticas y Censos* – INDEC (Argentina), *Instituto Nacional de Estadísticas* – INE (Chile) and *Departamento Administrativo Nacional de Estadística* – DANE e o *Banco de la República* (Colombia).

Using information from insurers in each country, a panel data regression model was created. Longitudinal data assist in the study of the determinants of profitability, as they evaluate insurance entities over time (Akotey et al., 2013). Similarly, Atsbeha & Kaur, (2017); Camino-Mogro & Bermúdez-Barrezueta, (2019) and Puławska, (2021) used this type of model to analyze and study the determinants of profitability in their countries of interest. For Gujarati & Porter (2011), among some of the benefits that panel data regression provides to a study, the following can be listed: better suitability for studying the dynamics of change in variables such as employment and income, better measurement and detection of effects compared to pure

cross-sectional studies and pure time series and, finally, the delivery of greater information, greater variability and less collinearity between variables due to the combination of time series and cross-sectional data.

It is important to note that the model developed considers the presence of control variables. Based on the data collected, the endogenous factors related to the insurance activity were selected for analysis. These include company size, measured by the natural logarithm of the insurer's total assets (Malik, 2011), the insurer's leverage ratio (Boadi, Antwi e Kofi, 2013), the insurer's liquidity ratio (Camino-Mogro & Bermúdez-Barrezueta, 2019) and loss ratio (Camino-Mogro & Bermúdez-Barrezueta, 2019). These variables seek to explain the impact of the insurer's internal context on its performance indicators.

Exogenous variables are those that capture the macroeconomic effects external to the insurance activity. For this study, the following variables were selected: the inflation rate (Oktiani et al., 2017), unemployment (Derbali & Lamouchi, 2021), GDP growth (Pattitoni et al., 2014) and the basic interest rate of each country (Ismail et al., 2018). These variables seek to explain the influence of the country's economic situation on the insurer's performance. Finally, a variable that captures the presence of Covid-19 (Puławska, 2021) in the year analyzed will be evaluated with the aim of analyzing the impact of the pandemic on the performance of insurers.

With this, three different models were created for each country:

$$ROA_{i,t} = \alpha + \beta_1 Size_{i,t} + \beta_2 Leverage_{i,t} + \beta_3 Liq_{i,t} + \beta_4 LossRatio_{i,t} + \beta_5 WrittenPrem_{i,t} + \beta_9 InterestRate_{t_t} + \beta_{10} GrowthGDP_t + \beta_{11} UnemRate_t + \beta_{12} Pandemic_t \quad (1)$$

$$ROE_{i,t} = \alpha + \beta_1 Size_{i,t} + \beta_2 Leverage_{i,t} + \beta_3 Liq_{i,t} + \beta_4 LossRatio_{i,t} + \beta_5 WrittenPrem_{i,t} + \beta_9 InterestRate_t + \beta_{10} GrowthGDP_t + \beta_{11} UnemRate_t + \beta_{12} Pandemic_t \quad (2)$$

$$ROI_{i,t} = \alpha + \beta_1 Size_{i,t} + \beta_2 Leverage_{i,t} + \beta_3 Liq_{i,t} + \beta_4 LossRatio_{i,t} + \beta_5 WrittenPrem_{i,t} + \beta_9 InterestRate_{t_t} + \beta_{10} GrowthGDP_t + \beta_{11} UnemRate_t + \beta_{12} Pandemic_t \quad (3)$$

in which the explanatory variables are represented by:

$Size_{i,t}$: denotes the size of an insurer and is calculated by the natural logarithm of the total assets of company *i* at the *t*-th instant of time. Malik (2011) studies this variable with the aim of determining the impact of the size of an insurer on its profitability.

$Leverage_{i,t}$: variable that measures the leverage level of an insurer *i* at time *t*. Its expression is given by the ratio between the insurer's total liabilities and the insurer's total assets, following the equation:

$$Leverage_{i,t} = \frac{Insurance\ Liabilities_{i,t}}{Insurance\ Asset_{i,t}} \quad (4)$$

While Boadi et al. (2013) indicate that leverage and ROA have a positive but low-significance relationship, Malik (2011) finds a negative relationship between these two variables.

$Liq_{i,t}$: determines the immediate liquidity of insurer *i* at the *t*-th moment, which is calculated using Equation (5):

$$Liq_{i,t} = \frac{Cash\ and\ Cash\ Equivalents_{i,t}}{Insurance\ Liabilities_{i,t}} \quad (5)$$

When analyzing this variable, Camino-Mogro & Bermúdez-Barrezueta (2019) found that there is empirical evidence that liquidity positively impacts the ROA and ROI of an insurance company.

$LossRatio_{i,t}$: variable that describes the relationship between the total number of claims occurring each year *t* for an insurer *i* and the total number of premiums earned. Equation (6) denotes its mathematical expression:

$$LossRatio_{i,t} = \frac{Losses\ due\ to\ Claims_{i,t}}{Earned\ Premiums_{i,t}} \quad (6)$$

In the analysis by Akotey et al. (2013), a negative relationship is perceived between the loss ratio and the net profit of insurers. However, the authors found evidence of a positive relationship between the loss ratio and the ROI of insurers. They argue that the increase in the loss ratio, caused by the incidence of moral hazard and adverse selection, generates the need to seek financing through other sources, such as investment income.

$WrittenPrem_{i,t}$: variable that denotes the total premiums issued by company *i* at the *t*-th instant of time. This relationship was the subject of study in Camino-Mogro & Bermúdez-Barrezueta (2019), where a positively significant relationship was found between the premium issued and the insurer's ROA.

In turn, the macroeconomic variables of the study are:

$InterestRate_t$: variable that represents the interest rate of a given country at time *t*. Cummins & Weiss (2013) show evidence that there is a positive relationship between the interest rate and the company's performance variable.

$GrowthGDP_t$: reports the GDP growth for a given country at the *t*-th instant of time. In the study by Pattitoni et al. (2014), it was found that GDP growth has a significantly positive relationship with the profitability of the insurer, confirming the hypothesis that when a country's indicators are better, the insurer's profitability increases.

$UnemRate_t$: denotes the unemployment rate that the country has at time *t*. Derbali & Lamouchi (2021) studied the relationship between macroeconomic variables and the performance of insurance companies, finding no significant effects between these variables and the profitability of the insurance companies studied.

$Pandemic_t$: variable that indicates the presence of the Covid pandemic at a given moment in time in the country studied. Studies have been conducted on this front seeking to understand how the occurrence of the Covid pandemic can affect a company's profitability (Puławska, 2021).

Finally, the variables to be explained are:

$ROA_{i,t}$: denotes the return on assets that insurer *i* produced at time *t*, according to the equation (7):

$$ROA_{i,t} = \frac{Net\ profit_{i,t}}{Assets_{i,t-1}} \tag{7}$$

$ROE_{i,t}$: denotes the return to the shareholders that insurer *i* produced at time *t*, according to the equation (8):

$$ROE_{i,t} = \frac{Net\ profit_{i,t}}{Net\ worth_{i,t-1}} \tag{8}$$

$ROI_{i,t}$: as a proxy for ROI, this work adopted the net profit divided by the financial investments that an insurance company *i* generated at time *t*, expressed by the equation (9):

$$ROI_{i,t} = \frac{Net\ profit_{i,t}}{Financial\ Investments_{i,t-1}} \quad (9)$$

The methodology used for data collection included a structured approach to obtaining information from regulatory bodies and official sources in five different countries, aiming to ensure consistency and comparability of data among the insurers analyzed. In Brazil, data were obtained from *Superintendência de Seguros Privados* (Susep); in Argentina, from *Superintendencia de Seguros de la Nación* (SSN); in México, from *Comisión Nacional de Seguros y Fianzas* (CNSF); in Chile, from *Comisión para el Mercado Financiero* (CMF); and in Colombia, from *Unidad de Proyección Normativa y Estudios de Regulación Financiera* (URF), responsible for financial regulation. In each country, insurers that met transparency criteria and that periodically reported their financial data were selected, ensuring a representative sample of companies for analysis. In total, data were collected from 222 insurers in Argentina, 165 insurers in Brazil, 65 insurers in Chile and 48 insurers in Colombia, allowing a more comprehensive comparative analysis of the endogenous and exogenous factors that impact performance in the insurance sector in Latin America.

The panel approach, in this context, allows for a more robust analysis, enabling consistent observation of time and country variations in the variables. For this study, an unbalanced panel was developed for each country, allowing the incorporation of information from companies with incomplete time series, increasing the representativeness of the model and exploring all the heterogeneity available in the data set. Baltagi (2021) highlights that these panels are especially useful in dynamic markets, such as the insurance sector, where the entry and exit of companies are frequent. In addition, the application of the robust Eicker-Huber-White estimator is essential to ensure statistical validity in scenarios with heteroscedasticity, a common characteristic in highly variable financial data. White (1980) emphasizes that this approach ensures consistent coefficients and adequate confidence intervals, even when the classical assumptions of homoscedasticity are violated.

4. Results and Discussions

Tables 1 to 4 show the main descriptive statistics of the variables studied for each of the 4 countries analyzed.

Table 1. Descriptive statistics for Argentine insurance company variables

Variables	Count	Mean	Standard Deviation	Minimum	1º Quartile	Median	3º Quartile	Maximum	Kurtosis	Skewness
Dependent Variables										
ROA	1290	0,054	0,250	-3,357	-0,017	0,033	0,115	2,580	42,099	-0,721
ROE	1290	0,086	2,470	-85,993	-0,038	0,099	0,328	7,461	1141,831	-32,826
ROI	1290	0,107	9,552	-215,353	-0,033	0,059	0,225	224,065	442,941	1,992
Independent Variables										
Size	1334	14,376	2,275	8,626	12,691	14,398	16,027	21,033	-0,488	0,046
Leverage	1334	0,522	0,260	0,002	0,337	0,573	0,725	1,082	-0,829	-0,459
Liq	1334	0,231	1,019	0,000	0,013	0,039	0,114	20,174	189,125	12,131
LossRatio	1334	1,205	10,370	0,000	0,112	0,324	0,515	252,546	343,261	17,259
WrittenPrem	1247	13,053	2,842	-6,908	11,703	13,320	14,861	19,597	4,776	-1,342
InterestRate	1334	52,859	23,184	26,250	38,000	40,000	75,000	97,000	-0,688	0,802
UnemRate	1334	9,044	1,617	6,900	7,000	9,200	10,400	11,600	-1,203	0,034
GrowthGDP	1334	0,339	6,041	-9,900	-2,600	-1,600	5,200	10,400	-0,624	0,020

Source: Authors' elaboration.

Table 2. Descriptive statistics for Brazilian insurance company variables.

Variables	Count	Mean	Standard Deviation	Minimum	1º Quartile	Median	3º Quartile	Maximum	Kurtosis	Skewness
Dependent Variables										
ROA	973	0,026	0,125	-0,998	0,001	0,018	0,048	2,062	122,858	6,394
ROE	973	0,126	0,304	-1,761	0,004	0,093	0,231	2,238	10,559	0,710
ROI	973	0,475	5,350	-16,776	0,000	0,055	0,237	141,393	522,729	21,380
Independent Variables										
Size	970	20,524	2,266	13,911	19,113	20,683	21,842	26,716	0,223	-0,074
Leverage	973	0,701	0,249	0,000	0,632	0,780	0,856	1,000	1,353	-1,435
Liq	973	0,249	3,730	0,000	0,002	0,007	0,020	82,007	383,344	19,287
LossRatio	909	0,738	5,259	-36,716	0,191	0,424	0,630	139,195	537,629	20,842
WrittenPrem	973	17,678	5,724	0,000	17,612	19,389	20,547	23,494	4,629	-2,351
InterestRate	973	7,846	3,599	3,020	4,420	6,420	10,750	13,750	-1,233	0,289
UnemRate	973	11,527	1,969	7,800	9,600	12,300	13,200	13,500	-0,687	-0,893
GrowthGDP	973	1,691	2,326	-3,300	1,200	1,800	3,000	4,800	0,473	-1,010

Source: Authors' elaboration.

Table 3. Descriptive statistics for Chilean insurance company variables.

Variables	Count	Mean	Standard Deviation	Minimum	1º Quartile	Median	3º Quartile	Maximum	Kurtosis	Skewness
Dependent Variables										
ROA	399	0,023	0,110	-1,079	0,004	0,017	0,046	0,457	45,719	-4,175
ROE	399	0,115	0,419	-6,220	0,032	0,129	0,211	1,576	131,490	-8,860
ROI	399	0,047	0,301	-4,730	0,006	0,033	0,112	1,085	160,096	-9,905
Independent Variables										
Size	408	19,097	1,965	14,964	17,751	19,149	20,492	23,079	-0,657	-0,030
Leverage	408	0,735	0,227	0,013	0,613	0,820	0,910	0,961	1,090	-1,340
Liq	408	0,243	1,822	0,000	0,010	0,043	0,127	35,053	326,414	17,487
LossRatio	400	0,364	1,570	-30,558	0,252	0,429	0,593	1,551	374,871	-19,157
EarnedPrem	404	17,386	2,263	6,148	16,046	17,929	18,958	21,162	4,215	-1,549
InterestRate	408	4,097	3,342	0,500	1,750	2,750	6,500	11,250	0,175	1,145
UnemRate	408	8,130	1,359	6,700	7,000	7,900	9,500	10,700	-0,714	0,819
GrowthGDP	408	2,038	4,832	-5,800	-0,100	1,300	3,900	11,700	0,259	0,497

Source: Authors' elaboration.

Table 4. Descriptive statistics for Colombian insurance company variables.

Variables	Count	Mean	Standard Deviation	Minimum	1º Quartile	Median	3º Quartile	Maximum	Kurtosis	Skewness
Dependent Variables										
ROA	294	0,002	0,104	-0,546	-0,014	0,016	0,050	0,193	10,116	-2,625
ROE	294	0,035	0,381	-1,596	-0,076	0,100	0,243	0,851	2,782	-1,287
ROI	294	-0,012	0,245	-1,364	-0,029	0,029	0,088	0,559	10,608	-2,705
Independent Variables										
Size	299	20,567	1,561	16,667	19,480	20,877	21,686	23,931	-0,601	-0,364
Leverage	299	0,777	0,150	0,021	0,732	0,826	0,868	0,960	5,383	-2,115
Liq	299	0,115	0,747	0,002	0,018	0,037	0,077	12,704	269,067	16,166
LossRatio	298	0,445	0,287	-0,388	0,254	0,438	0,569	2,249	9,229	1,953
WrittenPrem	299	19,370	2,510	0,000	18,620	19,746	20,642	22,616	33,278	-4,706
InterestRate	299	6,242	4,214	1,750	3,000	4,250	12,000	13,250	-1,118	0,780
UnemRate	299	11,485	2,197	9,400	9,700	10,500	13,700	15,900	-0,403	1,024
GrowthGDP	299	2,729	5,096	-7,000	0,600	2,600	7,300	10,700	-0,220	-0,327

Source: Authors' elaboration.

The analysis of the dependent variables ROA, ROE and ROI shows differences in the performance of insurance companies among the countries analyzed. Argentina had the highest average ROA (0.054), indicating greater efficiency in the use of assets, but also presented high

variability (standard deviation of 0.25) and high kurtosis (42.099), also signaling the presence of extreme observations. Brazil led in ROE (0.126), highlighting consistent returns to shareholders, but accompanied by a high kurtosis (10.559), reflecting the presence of outliers that influence the dispersion of the data. In Chile and Colombia, the ROI values (-0.012 and -0.012, respectively) were the lowest, showing difficulties in generating return on investments. These results corroborate the analysis of Biener & Eling (2012) e Cummins & Weiss (2013) that highlight how operational and structural factors can impact profitability in the insurance sector.

Firm's endogenous variables highlight operational differences influenced by local economic conditions. Colombia had the highest average leverage (0.777), evidencing dependence on external financing, common in emerging economies. Liquidity was also more dispersed in Colombia, with high kurtosis (189.125), indicating inequalities between companies. The premium was higher in Chile (19.370), reflecting higher collections in local currency, while in Argentina the lower values may be associated with inflation and devaluation. These differences reinforce the analysis by Eling & Schmit (2012) who argue that the efficiency and competitiveness of insurers are intrinsically linked to the economic and regulatory context of each country. Similarly, Boadi et al. (2013) analyze how liquidity and leverage affect the profitability of insurance firms in emerging markets, highlighting the difficulty and challenges of managing financial resources in highly volatile environments.

The macroeconomic exogenous variables, in turn, highlight the impact of the macroeconomic environment on the insurance sector. Argentina had the highest average interest rate (52.859), reflecting high financial costs that put pressure on insurers. In contrast, Brazil and Chile had more favorable conditions, with average rates of 7.846 and 6.242, allowing for greater financial stability. GDP growth was more significant in Chile (average of 2.729), while the contraction in Argentina (average of -0.339) highlighted the country's economic challenges. In Colombia, the higher unemployment rate (average of 11.527) pointed to limitations in consumption and competitiveness, in line with the analysis by Swiss Re (2020) on the impacts of macroeconomic factors on the insurance sector in Latin America. In line with the results, the studies by Pattitoni et al. (2014) and Derbali & Lamouchi (2021) also investigate the impacts of macroeconomic conditions, including GDP growth and interest rates, on the performance of the insurance sector, highlighting the relationship between economic stability and profitability.

Having carried out the analyses previously elaborated, Tables 5 to 8 present the results obtained from the models estimated for each country.

Table 5. Model results for ROA, ROE and ROI for Argentina

Variable		ROA	ROE	ROI
Intercept	Coefficient	0,074	-1,613	-3,379
	Standard Error	0,084	1,444	3,487
Size	Coefficient	0,003	0,0549º	-0,167
	Standard Error	0,009	0,031	0,442
Leverage	Coefficient	-0,2714***	-0,942	-1,655
	Standard Error	0,074	0,670	1,865
Liq	Coefficient	0,0348**	0,008	0,339
	Standard Error	0,013	0,028	0,340
LossRatio	Coefficient	0,001	0,006	0,018
	Standard Error	0,001	0,004	0,017
WrittenPrem	Coefficient	0,0199*	0,029*	0,234
	Standard Error	0,008	0,014	0,214
InterestRate	Coefficient	-0,0014**	0,005	0,018
	Standard Error	0,001	0,007	0,028
UnemRate	Coefficient	-0,006	0,094	0,373
	Standard Error	0,005	0,100	0,279
GrowthGDP	Coefficient	-0,0029***	-0,005	-0,021
	Standard Error	0,001	0,004	0,026
Pandemic	Coefficient	-0,0997***	-0,2143***	-1,368
	Standard Error	0,014	0,042	0,907
Regression R^2		0,083	0,010	0,008
p-value Hausmann Test		0,963	1,000	1,000
Type of estimation		Random Effects	Random Effects	Random Effects

Statistical significance: ***p<0.001, **p<0.01, *p<0.05, ºp<0.1. Source: Authors' elaboration.

Table 6. Model results for ROA, ROE and ROI for Brazil

Variable		ROA	ROE	ROI
Intercept	Coefficient	0,1369	-0,170	1,111
	Standard Error	0,1476	0,238	1,740
Size	Coefficient	0,0019	0,034**	0,054
	Standard Error	0,0053	0,011	0,050

Leverage	Coefficient	-0,0695	-0,051	-0,208
	Standard Error	0,0520	0,0824º	0,696
Liq	Coefficient	-0,0009º	-0,001	-0,006
	Standard Error	0,0005	0,001	0,009
LossRatio	Coefficient	0,0003	0,000	-0,003
	Standard Error	0,0002	0,001	0,005
WrittenPrem	Coefficient	0,0025**	0,0056º	0,025
	Standard Error	0,0009	0,003	0,035
InterestRate	Coefficient	-0,0024	-0,006	-0,1415º
	Standard Error	0,0022	0,004	0,079
UnemRate	Coefficient	-0,0102*	-0,0339***	-0,103
	Standard Error	0,0040	0,008	0,102
GrowthGDP	Coefficient	-0,0019	-0,0066**	0,163
	Standard Error	0,0011	0,003	0,140
Pandemic	Coefficient	-0,0148º	-0,0412**	-0,034
	Standard Error	0,0087	0,018	0,371
Regression R^2		0,027	0,087	0,006
p-value Hausmann Test		0,788	0,524	0,406
Type of estimation		Random Effects	Random Effects	Random Effects

Statistical significance: ***p<0.001, **p<0.01, *p<0.05, ºp<0.1. Source: Authors' elaboration.

Table 7. Model results for ROA, ROE and ROI for Chile.

Variable		**ROA**	**ROE**	**ROI**
Intercept	Coefficient	-0,6633	-0,8419*	-0,4663*
	Standard Error	0,4612	0,3309	0,231
Size	Coefficient	-0,0368	-0,0058	-0,011
	Standard Error	0,0544	0,0354	0,023
Leverage	Coefficient	-0,0916	-0,1690	-0,092
	Standard Error	0,2482	0,2521	0,169
Liq	Coefficient	0,0094	-0,0549	-0,028
	Standard Error	0,0344	0,0451	0,026
LossRatio	Coefficient	-0,0117	-0,0267*	-0,0129*
	Standard Error	0,0076	0,0117	0,005
WrittenPrem	Coefficient	0,0781**	0,0515*	0,027
	Standard Error	0,0309	0,0212	0,015
InterestRate	Coefficient	0,0019	0,0106º	0,010

	Standard Error	0,0034	0,0063	0,003
UnemRate	Coefficient	0,0092	0,0298	0,035
	Standard Error	0,0119	0,0251	0,013
GrowthGDP	Coefficient	-0,0005	-0,0014	0,000
	Standard Error	0,0007	0,0025	0,002
Pandemic	Coefficient	0,0153	0,0387	-0,014
	Standard Error	0,0241	0,0635	0,028
Regression R^2		0,149	0,055	0,040
p-value Hausmann Test		0,0003	0,996	0,380
Type of estimation		Fixed Effects	Random Effects	Random Effects

Statistical significance: ***p<0.001, **p<0.01, *p<0.05, °p<0.1. Source: Authors' elaboration.

Table 8. Model results for ROA, ROE and ROI for Colombia.

Variable		**ROA**	**ROE**	**ROI**
Intercept	Coefficient	-0,8088***	-2,5856***	-1,8483***
	Standard Error	0,2192	0,5532	0,538
Size	Coefficient	0,0408***	0,1729***	0,1163***
	Standard Error	0,0112	0,0353	0,031
Leverage	Coefficient	-0,1296	-1,7591***	-0,9271***
	Standard Error	0,0798	0,3317	0,236
Liq	Coefficient	-0,0658	-0,2627	-0,154
	Standard Error	0,0499	0,1624	0,110
LossRatio	Coefficient	-0,0378**	-0,1869*	-0,032
	Standard Error	0,0140	0,0814	0,026
WrittenPrem	Coefficient	0,0007	0,0044	0,001
	Standard Error	0,0010	0,0041	0,002
InterestRate	Coefficient	0,0019*	0,014***	0,003
	Standard Error	0,0009	0,0042	0,002
UnemRate	Coefficient	0,0052	0,0317	0,011
	Standard Error	0,0034	0,0160	0,008
GrowthGDP	Coefficient	0,0003	0,0035	0,001
	Standard Error	0,0006	0,0030	0,002
Pandemic	Coefficient	-0,0188	-0,0775	-0,036
	Standard Error	0,0131	0,0635	0,033
Regression R^2		0,190	0,253	0,185
p-value Hausmann Test		1,0000	0,894	1,000
Type of estimation		Fixed Effects	Random Effects	Random Effects

Statistical significance: ***p<0.001, **p<0.01, *p<0.05, °p<0.1. Source: Authors' elaboration.

The analysis of Tables 5 to 8 shows that the COVID-19 pandemic had significant effects, particularly in Argentina, where it reduced both ROA and ROE. In Brazil, the impact was limited to ROE, while in Chile and Colombia the effects were not statistically significant. These results are in line with the observations of Swiss Re (2020), which identified disproportionate impacts of the pandemic in more vulnerable emerging markets. In addition, the results are in line with the analysis carried out by Puławska (2021), finding negative relationships for the impact of the pandemic on insurers' performance variables.

Regarding the endogenous variables of firm behavior, insurer size was highly significant in Colombia for all profitability metrics, indicating that larger insurers can better capitalize their asset base, diversify risks, and improve operational efficiency. This result is consistent with Eling & Schmit (2012), who emphasize the importance of size for competitiveness in the insurance sector. These results are also consistent with the study by Malik (2011), demonstrating a positive relationship between performance and size of insurers.

Leverage, on the other hand, had a significant negative impact, highlighting the risks associated with high levels of debt in more unstable economies, as stated by Booth et al. (2001). In Argentina, this relationship was noticeable in ROA, while in Colombia the effects were even more pronounced, affecting ROE and ROI. These results reinforce the findings of Malik (2011), in addition to indicating that high debt compromises profitability by increasing financial costs and insolvency risks, as argued by Titman & Wessels (1988) e Modigliani & Miller (1963), who highlight the additional challenges in emerging markets.

The liquidity proxy was relevant in Argentina, where it positively influenced ROA, highlighting the importance of liquid assets to sustain operational efficiency in unstable markets. This is in line with the results of Camino-Mogro & Bermúdez-Barrezueta (2019), in addition to Mayers & Smith Jr (1981), since the latter argue that liquidity allows insurers to meet financial obligations without compromising stability.

Loss ratio had a significant negative impact on ROE in Chile and on ROA in Colombia, corroborating the statements of Akotey et al. (2013). The respective researchers, in an analysis carried out in Ghana, had similar results in terms of the relationship between loss ratio and

performance. Similarly, according to Cummins & Nini (2002), high levels of loss ratio have a negative relationship with the profit of insurers, affecting performance variables such as ROA.

Finally, premiums written were consistently positive in all countries, with a significant impact on ROA and ROE in Argentina and Brazil, and on all metrics in Chile. This result reflects the importance of revenues generated by policy sales for the sector's profitability, in line with what was observed in Camino-Mogro & Bermúdez-Barrezueta (2019).

On the other hand, regarding the macroeconomic exogenous variables of the study, the interest rate had a negative impact on ROI in Brazil, reflecting the challenges imposed by high interest rates, which increase the financial costs of insurers and limit the profitability of investments. On the other hand, the same variable had a positive impact on ROA in Colombia, as in the results of Cummins & Weiss (2013).

For GDP growth, a negative relationship with ROE was found in Brazil, contrary to what was pointed out by Pattitoni et al. (2014), suggesting that periods of economic slowdown increase the profitability of insurance companies. In other countries, GDP did not show statistical significance.

Finally, the unemployment rate had a negative impact on ROA in Brazil, reflecting how high levels of unemployment affect the payment capacity of policyholders and, consequently, the profitability of insurers; unlike what was argued by Derbali & Lamouchi (2021) who did not find significant relationships between unemployment and performance.

5. Conclusions and Final Considerations

The COVID-19 pandemic has been a global shock, directly affecting economic sectors and altering structural patterns in several markets. In the insurance sector, the crisis has had significant impacts, influencing operational and financial variables, such as leverage, liquidity, loss ratio and profitability performance.

Considering this scenario, this study sought to answer the following question:

Can it be said that the COVID-19 pandemic has caused any change in the behavior of the profitability determinants of insurers in Latin American countries?

The analysis demonstrated that the COVID-19 pandemic had a significant impact only on Argentine and Brazilian insurers, altering the operational and financial dynamics that determine their profitability. The literature on the insurance sector in emerging markets highlights that global crises amplify structural and operational challenges, such as excessive leverage and variations in liquidity, making the differences between consolidated and fragmented markets even more evident. These aspects were observed in the study, which analyzed how these conditions influenced key performance variables during the crisis.

Firms' endogenous factors played a critical role, with variables such as size and leverage highlighting the influence of insurers' internal structures. In emerging markets, the size of companies reflects their ability to adapt to abrupt changes in the economic environment, while excessive leverage has proven to be an element of fragility in contexts of prolonged instability. The pandemic, therefore, created the scenario for stress on these variables. Thus, it became crucial to develop robust financial strategies that aimed, above all, at operational stability.

The macroeconomic determinants of the economies studied, such as the recessionary periods seen in Argentina and Brazil, high interest rates, economic slowdown and rising unemployment, combined to impact the profitability of insurers. In some markets, the effects of exogenous variables amplified the challenges faced by the economies and consequently by insurers, while in others, they helped recovery and financial performance. These results point to the need for macroeconomic policies that protect the sector from systemic crises.

One of the challenges presented by the study is that the values were collected in local currency. This factor may compromise the comparability of some variables between models by country. Future studies could explore how the patterns identified during the pandemic period can be compared to other times of crisis in Latin America, with the aim of identifying mitigation strategies that can strengthen the sector in scenarios of global economic instability. A cross-country analysis is also suggested, applying conversion methodologies to a reference currency such as the dollar or euro, adjusted by purchasing power parity (PPP).

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