

DOI: 10.5281/zenodo.20475403

FINANCIAL ANALYSIS USING THE OHLSON MODEL APPLIED TO THE CONSTRUCTION MICROENTERPRISES OF RIOBAMBA

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Received: 03/11/2025

Accepted: 16/02/2026

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Summary

In Ecuador, the construction sector has been promoting socioeconomic development, which is where its importance and the need to know the financial and economic situation and its participation in the market in which it operates arises. To project financial and economic stability in these microenterprises, the objective is to apply the Ohlson model. According(Tonon, 2022)“In Ohlson's model, the statistical factors that affected the probabilities of bankruptcy are summarized as follows: company size, financial structure, performance measures and liquidity measures” (p.73). The research methodology that was used is deductive with a quantitative approach based on a non-experimental design of an exploratory and documentary type. For the analysis, information from 18 companies in the construction sector was considered. Through the use of documentary analysis and indirect observation techniques, with the instruments of the risk matrix and the indirect observation guide, the information was collected from the financial statements and results

corresponding to the year 2020, 2021 and 2022. of the Superintendency of Securities and Insurance Companies portal for the application of Ohlson's O1, O2 and O3 model and liquidity, solvency and profitability indicators. As a result, the instability of 7 microenterprises was projected through the O3 model, through the O2 model the instability of 11 construction companies was projected, and with the O1 model, 4 microenterprises were projected to be unstable. By applying the liquidity indicators, it was determined that the entities can cover their obligations with third parties, the indebtedness of microenterprises is relatively low, while the level of profitability, most microenterprises do not exceed 1% profitability in their operational activities.

Keywords: *Stability, microenterprises, construction sector, Ohlson model, liquidity, profitability, solvency.*

1. Introduction:

In Ecuador, the creation of microenterprises as a source of employment has been evident, thus improving the country's economy. This is why it is important that these microenterprises make a projection of their economic stability to remain active, maintaining optimal financial conditions for the development of their businesses. operational activities and increase its competitiveness in the market.

In the country, microenterprises are characterized by having gross income of up to 300,000 UDS and have up to 9 workers. These entities are regulated under the Superintendency of Companies, Securities and Insurance, made up of six regions such as Quito, Ambato, Cuenca, Loja, Machala, and Portoviejo. The Ambato regionalthisin charge of controlling and monitoring the provinces of Bolívar, Cotopaxi, Chimborazo, Pastaza and Tungurahua (Superintendence of Securities and Insurance Companies, 2022).

In Ecuador, 856,568 SMEs have been legally established, of which 2% are medium-sized, 7% small and 91% are represented by microenterprises, which contribute significantly to the country's economy with a rate greater than 25%. of GDP and creating sources of employment for 718,389 people. The annual incorporation rate of microenterprises in Ecuador is 18.7% and

liquidation rate is 8.7% (Superintendence of Securities and Insurance Companies, 2022).

According to the Superintendency of Securities and Insurance Companies (2022), in the first half of 2020, 676 companies belonging to the construction sector entered into the cancellation, dissolution and liquidation process; in the months of January and February 2022, 17 construction microenterprises entered this process. . All of this is triggered by the COVID 19 Pandemic, mobility restrictions and the lack of stability analysis in companies, leaving thousands of Ecuadorians without secure employment. Prior to their dissolution, microenterprises in the construction sector presented problems of economic stability, according to the 2019 financial information report issued by the Superintendency of Securities and Insurance Companies, the level of debt of the asset was 66%, in addition, it was obtained a net profit of 8,685,398.65 USD in construction microenterprises nationwide, for the years 2020 and 2021 the construction microenterprise sector presented economic instability, reporting a net loss of - 6,697,986.3 USD and -10,156,409.79 USD respectively, the level The indebtedness of the asset in 2020 was 69% and for 2021 it was 71%. By 2022, the stability of construction microenterprises was also affected because the construction sector during the period obtained a net loss of - 11,298,656.61 and asset debt rose to 72% (Table 1).

Table 1. Information on stability in microenterprises in the construction sector at the national level

Report on microenterprises in the construction sector at the national level					
Years	Net profit or loss	Asset	Heritage	Passive	Asset debt
2019	8,685,398.65	430,334,171.58	145,035,364.45	285,298,807.13	66%
2020	- 6,697,986.30	471,679,489.13	147,506,370.03	324,173,119.10	69%
2021	- 10,156,409.79	491,804,995.16	141,925,117.94	349,879,877.22	71%
2022	- 11,298,656.61	600,753,798.44	166,395,547.72	434,358,250.72	72%

Note. Own elaboration Source. Superintendence of Securities and Insurance Companies 2022

In the city of Riobamba, microenterprises are essential for the economic development of the city and the province, being the fundamental engine for reducing poverty and improving the lifestyle of citizens. Currently, there are 18 microenterprises of construction, which are classified as construction

of all types of residential buildings and construction of all types of non-residential buildings, which cover a workplace for more than 85 people.

In the economic report of the Superintendency of Securities and Insurance Companies of the financial

information of the construction microenterprises of the province of Chimborazo for the year 2019, the problems in economic stability that the entities presented, mainly with the level of indebtedness of the asset, were revealed. which was 58%, in addition, the equity was 148% committed to third parties and the net profitability of sales was -43%, indicating a negative profitability in microenterprises in the construction sector of the province of Chimborazo, without However, they presented a net profit of 40,830.01 USD. On the other hand, in 2020 the sector presented a net loss of -125,768.79 USD and asset debt increased to 62%. In the years 2021 and 2022, the stability of this sector was also affected because net losses of -158,097.63 USD and -39,172.12 USD respectively were reported, increasing the level of indebtedness of the asset for the year 2021 by 78%. and by 2022 by 79% (Table 2). After this, a report on dissolved and liquidated entities was issued indicating that, in the city of Riobamba from January 2020 to December 2022, 11 microenterprises entered this process, emphasizing that the year with the highest number of bankrupt construction microenterprises was in 2020 with a total of 5 entities, and between 2021 and 2022, 6 went bankrupt, representing 28% and 33% respectively, thus reducing sources of employment.((Superintendence of Companies, Securities and Insurance, 2022)g One of the most important sectors in Ecuador's economy is construction. According to data from the Superintendence of Companies, Securities and Insurance, 91% of the total entities established are microenterprises which have been generating greater sources of employment for citizens. in recent years; They are divided into five sectors, such as agriculture, commerce, manufacturing, real estate and construction, the latter sector in question, has been affected by internal and external factors that have caused the instability of these entities(Insurance, 2021). (Guevara, 2020)They mention factors that influence business stability "from the external sphere, economic, social, political and technological

factors. On the other hand, from the internal level, structural factors, staff training, size" (p. 133). Lately construction microenterprises have presented problemseconomicaland financial, giving rise to aineconomic stability, due to the lack of liquidity and the high level of debt causing them to enter the liquidation process, since from 2020 to 2022, 11 construction microenterprises in the city of Riobamba entered this process, the year with the highest number of microenterprises. Construction companies went bankrupt in 2020 with a total of 5 entities, and between 2021 and 2022 6 went bankrupt, representing 28% and 33% respectively. This is due to the instability presented by the construction microenterprises of Chimborazo in 2019, since the level of debt of the asset in that year was 58%, in addition, the equity was 148% committed to third parties and the net profitability sales was -43%. In 2020, the sector presented a net loss of -125768.79 USD and asset debt increased to 62%. In the years 2021 and 2022, the stability of this sector was also affected because net losses of -158097.63 USD and -39172.12 USD respectively were reported, increasing the level of indebtedness of the asset for the year 2021 by 78% and for the year 2022 by 79%. In the period corresponding to January 1, 2020 to December 31, 2022, 11 construction microenterprises in the city of Riobamba entered the process of cancellation, dissolution and liquidation, due to economic instability, low level of income and few opportunities. to obtain external financing from financial institutions(Superintendence of Companies, 2022) It is necessary to apply the Ohlson Model to determine the economic stability of microenterprises in the construction sectorand?allows projecting its long-term stability.The specific objectives are: Apply financial indicators of liquidity, solvency and profitability to project the economic situation of microenterprises in the construction sector using the Ohlson Model, as shown in Table 2.

Table 2. Financial indicators

Factor	Indicator	Formula
Liquidity	Current liquidity	=Current assets/Current liabilities
Solvency	Asset debt	=Total liabilities/Total assets
	Equity indebtedness	=Total liabilities/Equity
	Leverage	=Total assets/Equity
Cost effectiveness	Operating margin	=Operational profit/Sales
	Net Sales Profitability	=Net profit/Sales
	Operational Return on Equity	=Operational profit/Equity

Note: Liquidity, solvency and profitability indicators with their respective formulas.

Ohlson (1980) as cited in(Caro, 2012), performs a bankruptcy prediction model with companies from

the period 1970 – 1976. On this occasion the author does not use paired samples, since he works with a

sample of 105 firms in crisis and 2058 healthy firms. This was one of the first works that questions the paired design in this type of research. He attempts to compare the results of this study with others that have referred to the same time period. Among the variables considered, the size of the company, a measure of the financial structure, a measure of performance and the current liquidity ratio stand out, which were the ones that were significant (p. 36). Which three models are presented: 1 predicts bankruptcy within a year; Model 2 predicts bankruptcy within two years, given that the company did not fail in the following year; and, model 3 predicts bankruptcy in three years. Models 2 and 3 have somewhat weaker goodness-of-fit statistics(Tonon, 2022)

$$\begin{aligned}
 \text{Modelo O1} &= -1,32 - 0,407X_1 + 6,03X_2 \\
 &\quad - 1,43X_3 + 0,0757X_4 - 1,72X_5 \\
 &\quad - 2,37X_6 - 1,83X_7 + 0,28X_8 \\
 &\quad - 0,521X_9 \\
 \text{Modelo O2} &= 1,84 - 0,519X_1 + 4,76X_2 \\
 &\quad - 1,71X_3 + 0,297X_4 - 1,98X_5 \\
 &\quad - 2,74X_6 - 2,18X_7 + 0,780X_8 \\
 &\quad - 0,422X_9
 \end{aligned}$$

$$\begin{aligned}
 \text{Modelo O3} &= 1,13 - 0,478X_1 + 5,29X_2 - 0,990X_3 \\
 &\quad + 0,062X_4 - 1,91X_5 - 4,62X_6 \\
 &\quad - 2,25X_7 + 0,521X_8 - 0,212X_9
 \end{aligned}$$

Which are composed of an intersection and nine independent variables. The description of the variables of the Ohlson model is as follows:

- X1 (Size) = Logarithm (total assets / price level index).
- X2 = Total Liabilities / Total Assets.
- X3 = Working Capital / Total Assets.
- X4 = Current liabilities / Current assets.
- X5 = Solvency dummy: one if total liabilities exceed total assets, zero otherwise.
- X6 = Net profit / Total Assets.
- X7 = Operational result / Total obligations.
- X8 = Profitability dummy: one if net income was negative during the last two years, zero otherwise.
- X9 = Net Income t - Net Income t-1 / | Net Income t| + | Net Income t-1|

Parameters to interpret model results

With respect to the values obtained, the following values are defined as cut-off points:

Table 3. Model results

Score	Risk
O _i < 0	It involves cataloging the company with a Stability Project
O _i ≥ 0	It involves classifying the company as likely to be unstable.

Note: Source Molina Panchi et al. (2023), p. 122.

Model application

This author uses logistic regression analysis and obtained three estimates, which differ in the year to which the financial data used correspond. Specifically, Ohlson estimates a model with data from the year before the failure, another with data from two years before and the third with data from three years before the failure (Aguiar & García 2020, p.20).

Stability

“Economic stability, both monetary and financial, are basic elements to promote sustained growth. A stable system makes it possible to limit and resolve economic imbalances, promote long-term plans, facilitate the allocation of resources and encourage development” (Superintendence of Banks of Ecuador, 2018, p.8).

Factors that influence business stability

Guevara & Rojas (2020) mention factors that influence business stability “from the external sphere, economic, social, political and technological factors. On the other hand, from the

internal level, structural factors, staff training, size” (p. 133).

Financial instability

Gil et al., (2018) indicates that “financial instability is considered to be a slowdown in the activities of companies, probably caused by a slight drop in sales or by shocks external to the companies” (p. 311).

1.1.1 Financial analysis

Marcillo et al. (2021) mention that “financial analyzes are considered a fundamental piece to be able to detect the situation, as well as the economic and financial performance of every organization, through which difficulties can be detected and then the necessary corrections can be made.” (p.88).

1.1.1.1 Financial indicators

● **Liquidity ratios**

“These indicators arise from the need to measure the capacity of companies to pay their short-term obligations” (Superintendency of Securities and Insurance Companies, 2020, p.2).

● **Solvency ratios**

"Indebtedness or solvency indicators are intended to measure to what degree and in what way creditors participate in the financing of the company" (Superintendencia de Compañías Valores y Seguros, 2020, p.4).

- **Profitability ratios**

"Performance indicators, also called profitability or profitability, serve to measure the effectiveness of the company's management to control costs and expenses and, in this way, convert sales into profits" (Superintendencia de Seguridades e Inseguridades, 2020, p. 12).

For which the deductive research methodology was used, which allows us to go from general knowledge to the particular study of the problem, likewise the research approach was quantitative because numerical data obtained from the financial statements from 2020 to 2020 were studied. 2022 of the 18 microenterprises in the construction sector, with a non-experimental design, causal level and with a type of documentary research. We worked with the number of construction entities required to keep accounting and that are in the parameter of construction of all types of residential buildings and construction of all types of non-residential buildings that presented their financial statements until the year 2022, which were a total of 18 microenterprises, we worked with the income statements and financial situation.

In addition, the research allowed us to know the current situation of microenterprises through the application of liquidity indicators (current liquidity), solvency (asset debt, equity debt, leverage), profitability (operating margin, net sales profitability, operational profitability of the heritage)

The main results obtained through the application of the Ohlson model were: through the O3 model, it was possible to project the economic stability of 44% of the microenterprises, while 39% projected instability; on the other hand, the O2 model indicated that 39% % of microenterprises project stability and 61% of the remaining entities project instability. Through the O1 model, the stability of 78% of the construction microenterprises was projected and 22% projected instability. In the same way, when applying the financial liquidity indicators, it was determined that the entities do not have sufficient liquidity to cover their current obligations, the solvency indicator reflects that microenterprises are committed to third parties and present problems with their assets, on the other hand, the profitability index He showed that construction companies incur more costs and expenses that exceed the level of sales.

As a final result of the investigation, the lack of liquidity, low profitability and debt ratio in these microenterprises dedicated to the economic activity of the construction sector, and the stability of construction microenterprises varies depending on the application of the O3, O2 and O1 models. The document is structured by the summary, the introduction, methodology, conclusions and recommendations.

3.- Methodology

1.1.2 Deductive method

(Sanchez, 2018) "Method of knowledge that starts from the recognition of a general proposition to derive a particular proposition, that is, it goes from theory to facts. It consists of obtaining particular conclusions from a universal law" (p.90).

For this research, the deductive method was used, since it is based on general information until reaching the research problem, which is the study of the 18 construction microenterprises in the city of Riobamba, which were subject to analysis using the studied model and In this way, we can obtain particular information about each of them, drawing conclusions that validate the research.

1.2 Research focus

1.2.1 Quantitative

As mentioned (Neill & Cortez Suárez, 2018), "Quantitative research, also called empirical-analytical, rationalist or positivist, is research that is based on numerical aspects to investigate, analyze and verify information and data" (p.69).

The focus of this research was quantitative, because the data collection was carried out that were measured to know in detail the level of stability of microenterprises, using the financial statements that were obtained from the Superintendency of Companies, Securities and Insurance, for analysis.

1.3 Design of the investigation

1.3.1 Not experimental

The design of this research was non-experimental, because in the development of the research the variables were not manipulated, that is, they were measured in their natural form in order to measure the relationship that exists between them and interpret the results. .

1.4 Research level

1.4.1 Causal investigation:

This level of research is mainly used to understand which variable is the one that causes and the one that is the effect of a problem or phenomenon that is going to be predicted, for this reason the present research is at the cause level to determine the

relationship between the causal variable and the effect we intend to project.

1.5 Kind of investigation

1.5.1 Documentary research:

(Sanchez, 2018) "Type of research that collects information from secondary documentary sources. It makes use of books, research journals, thematic encyclopedias, written, recorded or digitized documents, etc." (p.80).

For the development of this research, financial information was obtained from the construction microenterprises of the city of Riobamba published

in the Superintendence of Companies, Securities and Insurance, for the application of the model under study and the financial and economic stability of these entities was known.

1.6 Study population

For the present study, the eighteen construction microenterprises that belong to group F4100.10 - Construction of all types of residential buildings and F4100.20 - Construction of all types of non-residential buildings required to keep accounting of the city of Riobamba, (see table 5).

Table 5. Active construction microenterprises in the city of Riobamba, required to keep accounting

No.	Name
1	CONSTRUSULTANA CIA.LTDA.
2	ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECCONSA" CIA.LTDA.
3	CONSTRUCTORA COTRASIERRA CIA. LTDA.
4	CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA
5	AINNCA CIA.LTDA.
6	ES&YCONSTRUCTORA CIA.LTDA.
7	CONSTRUCTORA SANTILLAN RIVERA CIA LTDA
8	CONSTRUCTORA HIDROESTRUCT SA
9	CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA.
10	CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.
eleven	COSMACOR SA
12	CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA.
13	CONSTRUCTORA RAMIAND SA
14	PROMAGNUS CONSTRUCCIONES CIA. LTDA.
fifteen	AMG CIVIL CONSTRUCTIONS CIA.LTDA.
16	GENERALSERVIX SAS
17	REAL ESTATE CONSTRUCTING-DREAMS SAS
18	PLPREMIUN SA

Note: Construction microenterprises required to keep accounting.

1.6.1 Documentary population

For the research, 54 financial statements and 54 income statements were considered, because 18 microenterprises were analyzed for a period of 3 years and in this way the economic stability of the microenterprises under study was projected (see table 6).

Table 6. Document population

No.	Documents	Number of microenterprises	Years analyzed	Number of documents
1	Statement of financial position	18	3	54
2	Comprehensive income statement	18	3	54

Note: The documentation to be analyzed consists of 54 documents in both financial statements and comprehensive income statements because the 3-year financial information of the 18 microenterprises in the construction sector of the city of Riobamba was analyzed.

1.7 Sample

• Sample of microenterprises

It was considered that the population of construction microenterprises required to keep accounting is not greater than one hundred, the sample was not calculated and we worked with 100% of the population that comprises the 18 microenterprises.

• Sample of the documentary population

We worked with 100% of the documentary population because they include the financial information of the microenterprises under study corresponding to the 3 years analyzed.

1.8 Techniques and instruments

1.8.1 Techniques

1.8.1.1 Document analysis

It is the exhaustive exploration of texts and documents on a particular topic. This technique is

used to select and extract information about the variable, from different approaches, allowing you to deepen your knowledge about the topic and the variable in terms of integration, corroboration and criticism (Useche et al., 2019, p. 48).

1.8.1.2 indirect observation

It is about a review of research based on past observations by other authors, which details the object or phenomenon that you want to study. The two forms of observation are valid since the sources are safe and reliable and therefore provide undoubtable information (Cabezas et al., 2018, p. 112).

1.8.2 Instruments

1.8.2.1 Document analysis guide

The information collected in other instruments by the researcher is noted in an organized manner, such as: accounts, management reports, technical reports, among others. It is important to highlight that this instrument is intended to record, but not to perform a measurement, so it is not essential to validate it, but it is essential to verify that the data found in the documents are reliable and respond to the criteria established in data collection (Useche et al., 2019, p. 49).

Through these tools, the financial information of microenterprises in the construction sector corresponding to the period 2020-2022 was collected from the portal of the Superintendency of Companies, Securities and Insurance and the model was applied to determine the stability of said microenterprises.

1.9 Data Processing and Interpretation Techniques

In this research work, the Ohlson model was applied to the financial information of the 18 microenterprises in the construction sector corresponding to the years 2020, 2021 and 2022, models O3, O2 and O1 were applied to each of the entities with the respective 9 indicators by the

respective constants that correspond to each model, in order to project the economic stability of the entities prior to the parameters established by the model which indicates that if the result obtained is less than zero it implies classifying the company with probability of stability, on the other hand, if the result obtained is greater than or equal to zero, the microenterprise is classified as having a probability of economic instability (Table 3).

The financial information was obtained from the portal of the Superintendency of Companies, Securities and Insurance, which was processed using the Microsoft Excel package for the respective application of the Ohlson model.

2. RESULTS AND DISCUSSION

2.1 APPLICATION OF THE OHLSON MODEL

When applying the Ohlson model to the construction microenterprises of the city of Riobamba, the O3 model was applied to the financial information corresponding to the year 2020, the O2 model to the financial information for the year 2021 and the O1 model to the financial information corresponding to the year 2021. year 2022; The model is predetermined by 9 coefficients that were multiplied to the 9 indicators respectively that were applied to the financial information of the microenterprises, after which it is added or subtracted from the constant predetermined by the model that varies between model O3, O2 and O1 , thus obtaining the results, which, if they are greater than or equal to zero, meant that the microenterprise projects instability and if the value obtained was less than zero, it is interpreted that the entity projects economic stability.

2.1.1 Model O3

Formula

$$Modelo\ O3 = 1,13 - 0,478X_1 + 5,29X_2 - 0,990X_3 + 0,062X_4 - 1,91X_5 - 4,62X_6 - 2,25X_7 + 0,521X_8 - 0,212X_9'$$

2.1.1.1 Microenterprises that project stability

Table 7 Result of the application of the Ohlson O3 model construction microenterprises that project stability, year 2020.

Ohlson O3 model Year 2020												
Score			Parameter									
O _i < 0			It involves cataloging the company with a Stability Project									
O _i ≥ 0			It involves classifying the company as likely to be unstable.									
Company	Result	Model	Coefficient									
			O3	x1	x2	X3	x4	X5	X6	X7	X8	X9
AINNCA CIA.LTDA.	Project stability	-26.10	1.13	-0.48	5.29	-0.99	0.06	-1.91	-4.62	-2.25	0.52	-0.21
ES&YCONSTRUCTORA CIA.LTDA.	Project stability	-0.14	1.13	-0.28	0.00	-0.99	0.00	0.00	0.00	0.00	0.00	0.00

CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA.	Project stability	-0.22	1.13	-0.36	0.00	-0.99	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.	Project stability	-0.14	1.13	-0.28	0.00	-0.99	0.00	0.00	0.00	0.00	0.00	0.00
COSMACOR SA	Project stability	-0.07	1.13	-1.11	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA RAMIAND SA	Project stability	-3.47	1.13	-0.77	0.00	-0.99	0.00	0.00	-2.92	0.00	0.00	0.08
PROMAGNUS CONSTRUCCIONES CIA. LTDA.	Project stability	-0.26	1.13	-0.62	0.00	-0.99	0.00	0.00	0.00	0.00	0.00	0.21
AMG CIVIL CONSTRUCTIONS CIA.LTDA.A262	Project stability	-0.33	1.13	-0.47	0.00	-0.99	0.00	0.00	0.00	0.00	0.00	0.00

Note: Results of the application of the O3 model, with the financial information of microenterprises for the year 2020.

With the application of the Ohlson O3 model to the 18 construction microenterprises in the city of Riobamba, seeking to project stability for 3 years starting from the year in which the financial information was taken (2020), it was possible to identify the entities that project stability, this means that These microenterprises have adequate economic stability, considering that the value obtained through the calculation is less than 0, determining that 8 entities meet this parameter as detailed below:

The micro-enterprise AINNCA CIA.LTDA. obtained a value of -26.10, which projects stability within three years from 2020, the variables that most influence this result are: term, for this reason they have a value of 0.00 X6 relates the net profit to the total assets, reflecting that for the period analyzed the entity obtained a positive net profit, of total debts, reducing the risk of instability.

The construction micro-enterprise ES&YCONSTRUCTORA CIA.LTDA. with a result of -0.14, the variables that influence obtaining this result are: working capital, the entity does not have current obligations, but it does have current assets, X6, X7 the entity did not obtain a profit during the period analyzed because it did not carry out any economic activity.

The micro-enterprises CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA, CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA and COSMACOR

SA obtained a result of -0.22, -0.14 and -0.07 respectively, the most representative variables are: X4, X5, these variables are represented by 0.00 because the entities do not have outstanding payment obligations, X6, X7, They did not carry out any economic activity that generated income or losses during the period. The entities present stability since they have assets that can help in their operation.

CONSTRUCTORA RAMIAND SA projects stability, the value obtained is -3.63, it can be seen that the most representative variables are: in the period analyzed, indicating that the lower the level of debt, the lower the probability of risk, X6 relates the net profit to the total assets, indicating that the microenterprise had positive results, comparison with the year prior to the year analyzed, however, remained positive.

The construction companies PROMAGNUS CONSTRUCCIONES CIA. LTDA. and AMGCONSTRUCCIONES CIVILES CIA.LTDA project economic stability, it can be seen that the most representative variables are: in the period analyzed. X6, X7, X8 and X9, like the previous variables, are represented by the value of zero given that the microenterprises did not carry out any economic activity that generated income or losses during the period.

Microenterprises that project instability Model O3

Table 8 Application of the Ohlson O3 model to construction microenterprises that project stability, year 2020.

Ohlson O3 model												
Year 2020												
Score						Parameter						
O _i < 0						It involves cataloging the company with a Stability Project						
O _i ≥ 0						It involves classifying the company as likely to be unstable.						
Company	Result	Model	Coefficient									
			x1	x2	X3	x4	X5	X6	X7	X8	X9	

		03	1.13	-0.48	5.29	-0.99	0.06	-1.91	-4.62	-2.25	0.52	-0.21
CONSTRUSULTANA CIA.LTDA.	Projects instability	45.03	1.13	-1.11	11.70	0.99	0.12	-1.91	27.85	5.95	0.52	-0.21
ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECCONSA" CIA.LTDA.	Projects instability	7.76	1.13	-1.47	5.28	0.39	0.10	0.00	1.25	0.57	0.52	0.00
CONSTRUCTORA COTRASIERRA CIA. LTDA.	Projects instability	4.28	1.13	-1.22	2.58	-0.66	0.02	0.00	1.09	1.09	0.52	-0.27
CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA	Projects instability	26.47	1.13	-1.13	2.09	-0.59	0.02	0.00	11.39	13.26	0.52	-0.23
CONSTRUCTORA SANTILLAN RIVERA CIA LTDA	Projects instability	3.48	1.13	-1.61	3.92	-0.06	0.06	0.00	-0.05	-0.05	0.00	0.15
CONSTRUCTORA HIDROESTRUCT SA	Projects instability	0.39	1.13	-0.71	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA.	Projects instability	10.08	1.13	-0.84	9.97	0.88	0.12	-1.91	0.00	0.00	0.52	0.22

Note: Results of the application of the O3 model, with the financial information of microenterprises for the year 2020.

Microenterprises that project instability, because the value obtained through the application of the O3 model was greater than 0, yes and detailed below. The construction company CONTRUSULTANA CIA. LTDA obtained a value of 45.03, it can be seen that the most representative variables are: In 2020, the entity obtained a loss in its net income, reflecting that the assets have not performed during the period, X7 reflected that its operating profit was negative.

The construction micro-enterprise EMPRESA CONSULTORA & CONSTRUCTORA ASOCIADOS "ECCONSA" CIA.LTDA., obtained a result of 7.76, the most significant variables were: X2 said result was obtained given that the entity has a similar value in both total assets and As in the total liabilities, this indicates that almost all of its assets are committed to liabilities, variable X4 indicated that the entity did not have sufficient liquidity to cover its current obligations, variable X6 indicated that the entity had a loss during the period analyzed and that its assets did not have any return with respect to the net results obtained.

The micro-enterprise CONSTRUCTORA COTRASIERRA CIA. LTDA. has obtained a result of 4.28, the indicators that have the most negative influence are: Negative operating profit compared to the higher level of total debt increases the risk of instability in the microenterprise.

The CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA obtained a result of 26.47. The most significant variables that influence the result are: asset. X7

reflected that the operating profit is negative compared to the higher level of total debts, which increases the risk of instability in the microenterprise.

CONSTRUCTORA SANTILLAN RIVERA CIA LTDA, the value obtained is 3.48, it can be seen that the most representative variables are: X2 indicates the relationship between liabilities and total assets that the entity has, reflecting the high amount of debts with third parties that the microenterprise has.

The microenterprise CONSTRUCTORA HIDROESTRUCT SA obtained a result of 0.39. The variables that influence obtaining this result are: and The micro-enterprise CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA. obtained a result of 10.08, the variables that influence to obtain this result are: X2 indicates that a higher level of debt compared to total assets increases the risk of instability, X3 the entity does not have enough money available to cover its current obligations, reflecting that The lower the working capital, the higher the risk. X4 relates current obligations to current assets, indicating that its short-term obligations exceed assets and it does not have the liquidity to meet them. X6 indicates that the profit obtained by the microenterprise in the period analyzed is not very significant. Values of the O3 model of the GENERALSERVIX SAS construction companies are not reflected; REAL ESTATE CONSTRUCTING-DREAMS SAS; PLPREMIUN SA; since they were established in 2021.

Model O2

Formula

$$\text{Modelo O2} = 1,84 - 0,519X1 + 4,76X2 - 1,71X3 + 0,297X4 - 1,98X5 - 2,74X6 - 2,18X7 + 0,780X8 - 0,422X9$$

2.1.1.2 Microenterprises that project stability

Table 9 Application of the Ohlson O2 model to construction microenterprises that project stability, year 2021.

Ohlson O2 model Year 2021												
Score			Parameter									
O _i < 0			It involves cataloging the company with a Stability Project									
O _i ≥ 0			It involves classifying the company as likely to be unstable.									
Company	Result	Model	Coefficient	Variables								
				x1	x2	X3	x4	X5	X6	X7	X8	X9
		O2	1.84	-0.519	4.76	-1.71	0.29	-1.98	-2.74	-2.18	0.78	-0.422
CONSTRUCTORA HIDROESTRUCT SA	Project stability	-0.48	1.84	-1.06	0.00	-1.26	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA RAMIAND SA	Project stability	-0.28	1.84	-0.83	0.00	-1.71	0.00	0.00	0.00	0.00	0.00	0.42
PROMAGNUS CONSTRUCCIONES CIA. LTDA.	Project stability	-0.54	1.84	-0.67	0.00	-1.71	0.00	0.00	0.00	0.00	0.00	0.00
AMG CIVIL CONSTRUCTIONS CIA.LTDA.A	Project stability	-0.38	1.84	-0.51	0.00	-1.71	0.00	0.00	0.00	0.00	0.00	0.00
GENERALSERVIX SAS	Project stability	-0.25	1.84	-0.38	0.00	-1.71	0.00	0.00	0.00	0.00	0.00	0.00
REAL ESTATE CONSTRUCTING-DREAMS SAS	Project stability	-0.90	1.84	-1.03	0.00	-1.71	0.00	0.00	0.00	0.00	0.00	0.00
PLPREMIUN SA	Project stability	-0.53	1.84	-0.66	0.00	-1.71	0.00	0.00	0.00	0.00	0.00	0.00

Note: Results of the application of the O2 model, with the financial information of microenterprises for the year 2021.

with the application of the O2 model to the financial information for the year 2021, it was determined that, of the 18 construction microenterprises, 7 project economic stability for two years from the reference year analyzed. either, because the value obtained once the model was applied was less than 0, these microenterprises are detailed below:

The microenterprises CONSTRUCTORA HIDROESTRUCT SA and CONSTRUCTORA RAMIAND SA obtained a result of -0.48 and -0.29 respectively, the variables that influence the result are: X2 reflects that the entities do not have obligations with third parties. With respect to the variables X6, X7, X8 and X9, they are valued at 0.00 because the entities did not carry out any economic activity during the analyzed period., yes However, entities have assets and equity that would allow them to start their economic activity and generate positive results or meet future obligations with third parties. Micro-enterprises PROMAGNUS

CONSTRUCCIONES CIA. LTDA., and AMGCONSTRUCCIONES CIVILES CIA.LTDA. obtained a value of -0.54 and -0.38 respectively, the most significant variables are: X3 indicates that the entities have all their assets accumulated in current assets, in addition they did not contract current obligations during the analyzed period, X4, X5, X7 these variables are valued with 0.00 because they do not have liabilities that affect their stability. The variables X6, X8, X9 are valued with 0.00 because during the year the microenterprises did not carry out any economic activity that would allow them to obtain income or losses. GENERALSERVIX SAS, INMOBILIARIA CONSTRUCTING-DREAMS SAS and PLPREMIUN SA project stability through the application of the O2 model, mainly because the variables , the variables X6, X7, However, entities have assets and equity that allow them to start their economic activity or meet future obligations with third parties.

2.1.1.3 Microenterprises that project instability Model O2

Table 10. Application of the Ohlson O2 model to construction microenterprises with instability projection, year 2021.

Ohlson O2 model Year 2021												
Score			Parameter									
O _i < 0			It involves cataloging the company with a Stability Project									
O _i ≥ 0			It involves classifying the company as likely to be unstable.									
Company	Result	Model	Coefficient	Variables								
				x1	x2	X3	x4	X5	X6	X7	X8	X9

		02	1.84	-0.519	4.76	-1.71	0.29	-1.98	-2.74	-2.18	0.78	-0.422
CONSTRUSULTANA CIA.LTDA.	Projects instability	40.74	1.84	-0.97	19.96	5.46	1.22	-1.98	12.01	2.16	0.78	0.25
ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECCONSA" CIA.LTDA.	Projects instability	1.04	1.84	-1.53	4.43	0.11	0.31	0.00	-1.76	-2.36	0.00	0.00
CONSTRUCTORA COTRASIERRA CIA. LTDA.	Projects instability	4.05	1.84	-1.32	2.32	-1.14	0.09	0.00	0.00	1.06	0.78	0.42
CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA	Projects instability	5.83	1.84	-1.18	3.98	-0.26	0.25	0.00	0.00	0.00	0.78	0.42
AINNCA CIA.LTDA.	Projects instability	2.43	1.84	-1.12	1.35	0.21	0.51	0.00	-0.13	-0.57	0.00	0.35
ES&YCONSTRUCTORA CIA.LTDA.	Projects instability	2.18	1.84	-0.87	0.00	0.00	0.00	0.00	0.86	0.00	0.78	-0.42
CONSTRUCTORA SANTILLAN RIVERA CIA LTDA	Projects instability	2.85	1.84	-1.67	3.01	-0.73	0.12	0.00	-0.01	-0.01	0.00	0.29
CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA.	Projects instability	0.94	1.84	-1.34	0.17	0.00	0.28	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.	Projects instability	0.79	1.84	-1.34	0.09	-0.01	0.21	0.00	0.00	0.00	0.00	0.00
COSMACOR SA	Projects instability	0.49	1.84	-1.21	0.00	-0.15	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA.	Projects instability	10.40	1.84	-0.91	8.97	1.51	0.55	-1.98	0.00	0.00	0.00	0.42

Note: Results of the application of the O2 model, with the financial information of microenterprises for the year 2021.

In the application of the O2 model that projects economic stability for 2 years starting from the year in which the financial information is taken, it was possible to determine 11 microenterprises that project economic instability, as follows:

The construction company CONSTRUSULTANA CIA.LTDA. presents a value of 40.74, the value obtained is due to the fact that its total obligations significantly exceed its total assets as shown by variable are high, the variable X6 indicates the relationship between the net result and the total assets, this value was obtained because the entity had a loss during the period.

The CONSULTING & CONSTRUCTION COMPANY ASSOCIATED "ECCONSA" CIA.LTDA. obtained a value of 1.04, the most significant variables that impact stability are: X2 which indicates that its total assets are 93% committed to liabilities, X3 reflected that the microenterprise did not have enough money to run its business on a daily basis, the value of X4 reflects that the entity did not have sufficient liquidity to cover its current obligations.

The micro-enterprise CONSTRUCTORA COTRASIERRA CIA. LTDA., obtained a value of 4.05, the most significant variables are: X6 is represented by 0.00 because the entity did not obtain net profit during the analyzed period.

The CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA obtained a result of 5.83, the most worrying variables that influence the result are: is the level of risk, the value of X6 that relates net profit to total assets indicates that the entity did not obtain any income or loss, that is, its net results were 0.00; while X7 indicates that the operating profit was 0.00 compared to the level of total debts. The microenterprise AINNCA CIA.LTDA., obtained a value of 2.43, the most significant variables that influence the result are: X2 with a value of 1.35 that indicates that the liabilities are more than the assets, the value of 0.21 of the microenterprise ES&YCONSTRUCTORA CIA.LTDA., obtained a value of 2.18, the most critical variable is X6 with a value of 0.86, which relates the net loss obtained during the period with the total assets; X9 allowed us to determine the variation in -42 of net profit. Variables X2, X3, The microenterprise CONSTRUCTORA SANTILLAN RIVERA CIA LTDA obtained a result of 2.85. The variables that influence the result are: X2 relates total liabilities to total assets, indicating that more than 50% of the assets are committed to third parties. X9, through this variable, the net income of the year analyzed is related to the net income of the previous year, determining the

variation that existed between said periods, reflecting a negative variation of 0.29. The micro-enterprise CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA., obtained a value of 0.94, the most significant variables are: the value of X4 with 8 when relating current liabilities in mtos with the assets held by the entity in the short term. The variables X6, X7, X8, X9 are valued at 0.00 because in the period analyzed the microenterprise did not performed economic activity that allows it to obtain income or

losses, like the microenterprise CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.. which obtained a result of 0.79, however, the entity in the variables pay. The micro-enterprises COSMACOR SA, and CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA. They obtained a value of 0.49 and 10.40 respectively, the most significant variables are: X4 relates current liabilities to the assets owned by the entity in the short term. The variables X6, X7, X8,

2.1.2 Model 01 Formula

$$Modelo\ 01 = -1,32 - 0,407X1 + 6,03X2 - 1,43X3 + 0,0757X4 - 1,72X5 - 2,37X6 - 1,83X7 + 0,28X8 - 0,521X9$$

2.1.2.1 Microenterprises that project stability

Table 11. Application of the Ohlson 01 model to construction microenterprises that project stability, year 2022.

Ohlson 01 Model Year 2022												
Score		Parameter										
Oi < 0		It involves cataloging the company with a Stability Project										
Oi ≥ 0		It involves classifying the company as likely to be unstable.										
Company	Result	Model	Coefficient	Variables								
		Result	O1	x1	x2	X3	x4	X5	X6	X7	X8	X9
CONSTRUCTORA COTRASIERRA CIA. LTDA.	Project stability	-1.45	-1.32	-1.01	2.94	-0.95	0.02	0.00	0.00	-0.89	0.28	-0.52
AINNCA CIA.LTDA.	Project stability	-11.02	-1.32	-0.82	0.10	-1.15	0.00	0.00	-0.02	-8.22	0.00	0.41
ES&YCONSTRUCTORA CIA.LTDA.	Project stability	-2.18	-1.32	-0.23	0.00	-1.43	0.00	0.00	0.00	0.00	0.28	0.52
CONSTRUCTORA HIDROESTRUCT SA	Project stability	-3.84	-1.32	-0.82	0.11	-1.04	0.00	0.00	-0.25	0.00	0.00	-0.52
CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA.	Project stability	-3.14	-1.32	-0.39	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.	Project stability	-3.14	-1.32	-0.39	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00
COSMACOR SA	Project stability	-2.37	-1.32	-0.93	0.00	-0.12	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA.	Project stability	-3.14	-1.32	-0.39	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTORA RAMIAND SA	Project stability	-3.10	-1.32	-0.35	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00
PROMAGNUS CONSTRUCCIONES CIA. LTDA.	Project stability	-3.26	-1.32	-0.51	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00
AMG CIVIL CONSTRUCTIONS CIA.LTDA.	Project stability	-3.14	-1.32	-0.39	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00
GENERSERVIX SAS	Project stability	-3.14	-1.32	-0.39	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00
REAL ESTATE CONSTRUCTING-DREAMS SAS	Project stability	-3.55	-1.32	-0.80	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00
PLPREMIUN SA	Project stability	-3.26	-1.32	-0.51	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00

Note: Results of the application of the O1 model, with the financial information of microenterprises for the year 2022.

With the application of the O1 model, it was projected the financial and economic stability

within 1 year taking as a reference the financial information of the period 2022, determining the

following construction micro-enterprises that project stability:

The micro-enterprise CONSTRUCTORA COTRASIERRA CIA. LTDA. obtained a result of -1.45, the indicators that most positively influence obtaining this result are: X3 indicates that the entity has sufficient liquidity to cover its short-term obligations, reducing the risk of instability in the microenterprise, reflecting that its operational activities were positive.

The construction company AINNCA CIA.LTDA obtained a value of -11.02, it can be seen that the most representative variables are: short-term obligations, The micro-enterprise ES&YCONSTRUCTORA CIA.LTDA. obtained a result of -2.18, the most positively significant indicators to obtain said result are: X3 indicates that the entity has sufficient liquidity to cover its short-term obligations. X5 is valued at 0.00 because the entity did not have liabilities and only has assets. X6, X7 are valued with 0.00 because the entity in the analyzed period did not carry out any economic activity that generated results.

CONSTRUCTORA HIDROESTRUCT SA obtained a result of -3.84, the most relevant variables that influence the result are: X2, X4 which indicates that its liabilities are lower in relation to total assets, X3 indicates that the entity could cover its obligations currents. X6, X7, X8, X9 are valued at 0.00 because the entity did not carry out any economic activity during the period that generated results.

lto CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA. and the CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA. obtained a result of -3.14, the most relevant variables that influence the result are: X2, X4 are valued with 0.00 because the microenterprises in the analyzed period did not have liabilities, They are valued at 0.00 because the entities did not carry out any economic activity during the period that generated results.

The micro-enterprises CONSTRUCTORA COSMACOR SA; CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA; CONSTRUCTORA RAMIAND SA, CONSTRUCTORA AMGCONSTRU CCIONES CIVILES CIA.LTDA., GENERALSERVIX SAS, INMOBILIARIA CONSTRUCTING-DREAMS SAS and CONSTRUCTORA PLPREMIUN SA project stability because the construction companies did not have liabilities, which is why the variables X2, X4 were valued at 0.00. In addition, the variables X6, X7, X8, X9 are also valued with 0.00 because the entities did not carry out any economic activity during the period that generated results. However, entities have assets and equity that allow them to begin their economic activities or meet future obligations with third parties.

Microenterprises that project instability Model 01

Table 12. Application of the Ohlson 01 model to construction microenterprises with a probability of instability, year 2022.

Ohlson 01 Model Year 2022												
Score		Parameter										
O _i < 0		It involves cataloging the company with a Stability Project										
O _i ≥ 0		It involves classifying the company as likely to be unstable.										
Company	Result	Model	Coefficient	Variables								
				x1	x2	X3	x4	X5	X6	X7	X8	X9
		Result	O1	-	-	-	-	-	-	-	-	-
CONSTRUSULTANA CIA.LTDA.	Projects instability	27.19	-1.32	1.32	-0.4	6.03	1.43	0.0757	1.72	2.37	1.83	0.28
ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECCONSA" CIA.LTDA.	Instability probability	7.83	-1.32	0.74	25.29	4.57	0.32	-1.72	0.00	0.00	0.28	0.52
CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA	Instability probability	3.13	-1.32	-	0.99	7.64	1.14	0.20	-1.72	2.09	0.78	0.00
CONSTRUCTORA SANTILLAN RIVERA CIA LTDA	Instability probability	0.50	-1.32	-	0.92	6.33	0.09	0.08	-1.72	0.48	0.34	0.28
				-	1.36	4.13	0.35	0.05	0.00	0.16	0.00	0.49

Note: Results of the application of the 01 model, with the financial information of microenterprises for the year 2022.

Interpretation

with the application of the same model 01, it was possible to determine the microenterprises that project instability:

The construction company CONSTRUSULTANA CIA.LTDA. obtained a value of 27.19, this value is either because X2, which relates total liabilities to total assets, indicated that its

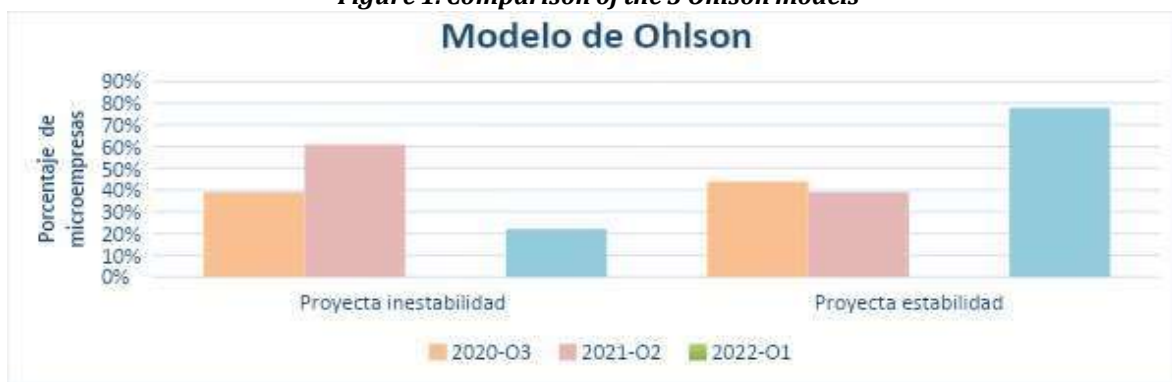
obligations to third parties were greater than the assets owned by the entity.;X3 indicated that the entity does not have sufficient liquidity to cover its current obligations, X4 indicated that current liabilities exceeded current assets, variables X6, X7 were valued with 0.00 because the entity did not carry out any activity that generated results during the analyzed period.

The ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECCONSA" CIA.LTDA obtained a result of 7.83, the most influential variables are: X2 because the total liabilities that the entity has exceed the total assets, X6 reflects that EUNoHE had a performance total assets; X7 indicates that the

operating profit is negative compared to the higher level of total debts, increasing the risk of instability. The CONSTRUCTORA WILSON ROMERO ALDAS WILROMA CONSTRUCTORA CA obtained a result of 3.13, the most worrying variables in the result are: loss, X7 indicated that the operating profit is 0.00 compared to the highest level of total debts, increasing the risk of instability. The CONSTRUCTORA SANTILLAN RIVERA CIA LTDA. obtained a value of 0.50, this value was obtained due to the following variables: to that its obligations with third parties were representative of the assets owned by the entity, X7 the entity did not obtain operational results during the period.

2.1.3 Comparison of the three models

Figure 1. Comparison of the 3 Ohlson models



Note. The graph indicates the comparison between the Ohlson models 03, 02, 01 and the stability projection obtained.

Through the application of the Ohlson model to the 18 construction microenterprises in the city of Riobamba, both their economic stability and instability are projected, as detailed below:

Using the 03 model that projects stability for 3 years from the financial statements of 2020, it was determined that 44% of construction microenterprises project stability and the remaining 39% project instability. Through this information, it can be deduced that not even 50% of microenterprises project adequate economic stability, this result being mainly influenced by the significant value in outstanding short-term payment obligations and little profit they perceive in their operational activities.

Through the 02 model, the projection for 2 years from now based on the financial information for the year 2021, it was determined that 39% of microenterprises project economic stability, while

61% of construction companies project instability, that is, more than 50% of the entities may present economic problems within 2 years, this was due to the fact that the entities acquire greater obligations compared to the short-term payment capacity, in addition, the results obtained in their economic activities were negative or insignificant.

The 01 model projects stability within 1 year of its application using the financial information for the period 2022, allowing us to determine that 78% of microenterprises project economic stability while 22% project instability, due to the fact that in the year of The information analyzed improved the income obtained from economic activity, in addition, obligations with third parties decreased and certain construction companies, despite not having economic activity that generates results, have assets and equity that would allow them to start the business.

2.2 Application of financial indicators

2.2.1 Liquidity Indicators

Table 13. Liquidity indicator applied to construction microenterprises

Liquidity indicators applied to Construction Microenterprises		
Period 2022		
	Formula Current liquidity =	Current active
		Current liabilities

No.	Microbusinesses	Application		Result
1	CONSTRUSULTANA CIA.LTDA.	7761.00	=	0.24
		32548.04		
2	ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECCONSA" CIA.LTDA.	14724.49	=	0.37
		39437.81		
3	CONSTRUCTORA COTRASIERRA CIA. LTDA.	36077.08	=	3.12
		11553.83		
4	CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA	20574.63	=	0.94
		21833.75		
5	AINNCA CIA.LTDA.	9804.12	=	51.25
		191.31		
6	ES&YCONSTRUCTORA CIA.LTDA.	400	=	-
		0		
7	CONSTRUCTORA SANTILLAN RIVERA CIA LTDA	221913.12	=	1.42
		156476.88		
8	CONSTRUCTORA HIDROESTRUCT SA	8944.99	=	41.30
		216.58		
9	CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA.	1000	=	-
		0		
10	CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.	1000	=	-
		0		
eleven	COSMACOR SA	1906	=	-
		0		
12	CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA.	1000	=	-
		0		
13	CONSTRUCTORA RAMIAND SA	800	=	-
		0		
14	PROMAGNUS CONSTRUCCIONES CIA. LTDA.	2000	=	-
		0		
fifteen	AMG CIVIL CONSTRUCTIONS CIA.LTDA.	1000	=	-
		0		
16	GENERSERVIX SAS	1000	=	-
		0		
17	REAL ESTATE CONSTRUCTING-DREAMS SAS	11000	=	-
		0		
18	PLPREMIUN SA	2000	=	-
		0		

Note. This table shows the results obtained by applying the current liquidity indicator to the 18 construction microenterprises with the information obtained from the year 2022.

By applying the current liquidity indicator to the 18 construction microenterprises in the city of Riobamba, it was possible to measure the capacity of the entities to pay off their short-term obligations, as detailed below.

The construction companies CONTRUSULTANA CIA. LTDA., CONSULTING & CONSTRUCTION COMPANY ASSOCIATED "ECCONSA" CIA.LTDA. and CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA obtained a result less than 1 indicating that they do not have sufficient liquidity to cover their short-term obligations, this is mainly due to the fact that their current liabilities or obligations with third parties are greater than the current assets they have. microenterprises.

On the other hand, the construction companies CONSTRUCTORA COTRASIERRA CIA. LTDA., AINNCA CIA.LTDA., CONSTRUCTORA SANTILLAN RIVERA CIA LTDA, and CONSTRUCTORA HIDROESTRUCT SA returned

a result greater than 1 indicating that they have sufficient liquidity to meet their current obligations, because their current assets exceed the current liabilities, that is, these microenterprises have circulating money or assets that can be converted into cash for twelve months to be able to pay their short-term obligations on time.

With respect to the micro-enterprises ES&YCONSTRUCTORA CIA.LTDA., CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA., CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA., COSMACOR SA, CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA., CONSTRUCTORA RAMIAND SA, PROMAGNUS CONSTRUCCIONES CIA. LTDA., AMG CONSTRUCCIONES CIVILES CIA.LTDA., GENERSERVIX SAS, INMOBILIARIA CONSTRUCTING-DREAMS SAS and the construction company PLPREMIUN SA, it was not possible to apply the current liquidity indicator,

because the entities only have current assets but do not have outstanding obligations. payment with third parties in the short term. However, these entities could contract future obligations that do not exceed their current assets so that they have adequate liquidity.

By applying the current liquidity indicator, it was determined that 4 microenterprises have adequate liquidity to cover their current obligations, because

their assets exceed liabilities. While 3 microenterprises do not have adequate liquidity to meet their current debts with third parties, indicating that their liabilities exceeded the current assets of the microenterprises. The remaining 11 microenterprises have current assets but no obligations to third parties.

Solvency indicators

Table 14. Solvency indicator applied to construction microenterprises.

Solvency indicators													
YEAR 2022													
No.	Microbusinesses	Asset debt				Equity Debt				Leverage			
		Totally passive		Total active		Totally passive		Heritage		Total active			
1	CONSTRUSULTANA CIA.LTDA.	32548.04		4.19	419%	32548.04		-1.31	-131%	7761.00		-0.31	-31%
		7761.00	=			-24787.04	=			-24787.04	=		
2	ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECCONSA" CIA.LTDA.	39437.81		1.27	127%	39437.81		-4.74	-474%	31121.46		-3.74	-374%
		31121.46	=			-8316.35	=			-8316.35	=		
3	CONSTRUCTORA COTRASIERRA CIA. LTDA.	17909.86		0.49	49%	17909.86		0.95	95%	36765.42		1.95	195%
		36765.42	=			18855.56	=			18855.56	=		
4	CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA	21833.75		1.05	105%	21833.75		-	2123%	20805.42		-	2023%
		20805.42	=			-1028.33	=			-1028.33	=		
5	AINNCA CIA.LTDA.	191.31		0.02	2%	191.31		0.02	2%	11935.49		1.02	102%
		11935.49	=			11744.18	=			11744.18	=		
6	ES&YCONSTRUCTORA CIA.LTDA.	0.00		0.00	0%	0.00		0.00	0%	400.00		1.00	100%
		400.00	=			400.00	=			400.00	=		
7	CONSTRUCTORA SANTILLAN RIVERA CIA LTDA	181682.17		0.68	68%	181682.17		2.17	217%	265438.07		3.17	317%
		265438.07	=			83755.90	=			83755.90	=		
8	CONSTRUCTORA HIDROESTRUCT SA	216.58		0.02	2%	216.58		0.02	2%	12026.69		1.02	102%
		12026.69	=			11810.11	=			11810.11	=		
9	CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA.	0.00		0.00	0%	0.00		0.00	0%	1000.00		1.00	100%
		1000.00	=			1000.00	=			1000.00	=		
10	CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.	0.00		0.00	0%	0.00		0.00	0%	1000.00		1.00	100%
		1000.00	=			1000.00	=			1000.00	=		
eleven	COSMACOR SA	0.00		0.00	0%	0.00		0.00	0%	22365.09		1.00	100%
		22365.09	=			22365.09	=			22365.09	=		
12	CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA.	0.00		0.00	0%	0.00		0.00	0%	1000.00		1.00	100%
		1000.00	=			1000.00	=			1000.00	=		
13	CONSTRUCTORA RAMIAND SA	0.00		0.00	0%	0.00		0.00	0%	800.00		1.00	100%
		800.00	=			800.00	=			800.00	=		
14	PROMAGNUS CONSTRUCCIONES CIA. LTDA.	0.00		0.00	0%	0.00		0.00	0%	2000.00		1.00	100%
		2000.00	=			2000.00	=			2000.00	=		
fifteen	AMG CIVIL CONSTRUCTIONS CIA.LTDA.	0.00		0.00	0%	0.00		0.00	0%	1000.00		1.00	100%
		1000.00	=			1000.00	=			1000.00	=		
16	GENERSERVIX SAS	0.00		0.00	0%	0.00		0.00	0%	1000.00		1.00	100%
		1000.00	=			1000.00	=			1000.00	=		
17	REAL ESTATE CONSTRUCTING-DREAMS SAS	0.00		0.00	0%	0.00		0.00	0%	11000.00		1.00	100%
		11000.00	=			11000.00	=			11000.00	=		
18	PLPREMIUN SA	0.00		0.00	0%	0.00		0.00	0%	2000.00		1.00	100%
		2000.00	=			2000.00	=			2000.00	=		

Note. This table shows the results obtained by applying the solvency indicator using the asset indebtedness, equity indebtedness and leverage indices applied to the 18 construction microenterprises with the information obtained from the year 2022.

By applying solvency indicators such as asset indebtedness, equity indebtedness and leverage applied to the 18 construction microenterprises, it was possible to determine the level of solvency of the entities, as detailed below.

The construction company CONTRUSULTANA CIA. LTDA. Regarding the debt of its assets, it indicates that its assets are committed 4 times with the total liabilities, this indicates that the entity has more outstanding obligations than total assets. On the other hand, the equity debt ratio for the year 2022 was -4.74, since the equity is negative because the losses exceed the share capital, this indicates that the equity cannot meet its obligations with third parties. The leverage for the year 2022 was -31%, indicating that the equity being negative did not help to obtain assets for the operation of the entity.

The CONSULTING & CONSTRUCTION COMPANY ASSOCIATED "ECCONSA" CIA.LTDA. For the year 2022, the debt of its assets was 127%, this is because its total liabilities exceed its total assets. The level of indebtedness of the equity in the same year was -474%, this is because the equity was negative during the period showing risk for the entity. The leverage for the year 2022 was -374%, indicating that the equity being negative did not help to obtain assets for the operation of the entity.

The micro-enterprise CONSTRUCTORA COTRASIERRA CIA. LTDA. For the year 2022, the debt of its assets was 49%, this indicates that less than fifty percent of the total assets are committed to the obligations with third parties that the entity has. On the other hand, the microenterprise's assets were 95% compromised in 2022, which could be risky for the entity. The leverage of the construction company for the year 2022 was 195%, this indicates that for every dollar of equity, 1.95usd of assets have been achieved.

The CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA for the year 2022, the debt of its assets was 1.05, this indicates that 105% of its assets have been financed through debts with third parties. The indebtedness of the construction company's assets for the year 2022 was -21.23, this is because its assets were negative, that is, its assets are insufficient to meet its obligations.

The indebtedness of the assets of the construction company AINNCA CIA.LTDA. For the year 2022 it was 0.02, this means that 2% of its assets have been financed through debt with third parties. Likewise, the debt of the construction company's assets was 0.02, which means that 2% of its assets are

committed to its liabilities. On the other hand, the construction company's leverage was 1.02, this indicates that for every dollar of equity, 1.02 dollars of assets have been obtained.

The indebtedness of the assets of the construction company ES&YCONSTRUCTORA CIA.LTDA. For the year 2022 it was 0, this means that its assets have not been financed through debt with third parties. The indebtedness of the construction company's assets in the same period was 0, which indicates that its assets are not committed to its liabilities. By applying the leverage index, a value of 1 was obtained, this indicates that for every dollar of equity, 1 dollar of assets have been obtained for the operation of the business.

By applying the debt index of the assets of CONSTRUCTORA SANTILLAN RIVERA CIA LTDA for the year 2022, a value of 0.68 was obtained, this means that 68% of its assets have been financed through debt with third parties. On the other hand, the equity indebtedness for the year 2022 was 2.17, this means that 217% of its equity is committed to its liabilities, which indicates that its obligations with third parties exceed the entity's equity. The leverage of the construction company for the year 2022 was 3.17, this indicates that for every dollar of equity, 3.17 dollars of assets have been obtained for the operation of the business.

The debt of the assets of CONSTRUCTORA HIDROESTRUCT SA for the year 2022 was 0.02, this means that 2% of its assets have been financed through debt with third parties. On the other hand, the debt of the assets was 0.02, this means that 2% of their assets are committed to their liabilities. The leverage of the construction company for the year 2022 was 1.02, this indicates that for every dollar of equity, 1.02 dollars of assets have been obtained for the operation of the business.

By applying the solvency indicators to CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA, the following results could be determined: the asset debt for the year 2022 was 0, this means that its assets have not been financed through debt with third parties, This is because the entity does not have pending payment obligations, just as in the case of equity indebtedness it was 0, this means that its equity is not committed to its liabilities. On the other hand, the construction company's leverage was 1, this indicated that for every dollar of equity, 1 dollar of assets were obtained.

Through the application of solvency indicators to CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA. The following results could be determined: The asset debt for the

year 2022 was 0, this means that its assets have not been financed through debt with third parties. The indebtedness of the assets was 0, this means that their assets are not committed to the liabilities, this is because the construction company in the analyzed period did not have outstanding payment obligations. The entity's leverage for the year 2022 was 1, this indicates that for every dollar of equity, 1 dollar of assets has been achieved.

By applying the solvency indicators to the construction company COSMACOR SA, the following results were obtained: The asset debt for the year 2022 was 0, this means that its assets have not been financed through debt with third parties. Just as the debt of the assets was 0, this means that their assets are not committed to their liabilities. On the other hand, the leverage of the construction company was 1, this indicates that for every dollar of equity, 1 dollar of assets were obtained for the operation of the entity.

The indebtedness of the assets of CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA. for the year 2022 it was 0, this meant that its assets have not been financed through debt with third parties, just as the equity indebtedness for the year 2022 was 0, this meant that its assets were not committed to its liabilities,

This is because the construction company did not contract obligations with third parties during the analyzed period. The leverage of the construction company for the year 2022 was 1, this indicated that for every dollar of equity, 1 dollar of assets have been obtained for the operation of the entity. When applying solvency indicators to microenterprises CONSTRUCTORA RAMIAND SA, PROMAGNUS CONSTRUCCIONES CIA.LTDA., AMG CONSTRUCCIONES CIVILES CIA.LTDA., GENERALSERVIX SAS, INMOBILIARIA CONSTRUCTING-DREAMS SAS and PLPREMIUN SA, the following results were obtained: The asset debt of microenterprises for the year 2022 was 0, this means that their assets have not been financed through debt with third parties, this is because the entities do not have outstanding obligations and only have assets. The equity indebtedness indicator showed that by 2022 the equity of microenterprises is not committed to their liabilities, the result was 0.

The leverage indicator of microenterprises for the year 2022 was 1, this indicated that for every dollar of equity, 1 dollar of assets were obtained in each of the entities for their respective operation.

Profitability indicators

Table 15. Profitability indicators applied to construction microenterprises

Profitability indicators										
YEAR 2022										
No.	Microbusinesses	Operating margin			Net sales profitability			Operational profitability of equity		
		Operational utility			Net profit			Operational utility		
		Sales			Sales			Heritage		
1	CONSTRUSULTANA CIA.LTDA.	0.00	=	-	0.00	=	-	0.00	=	0.00
		0.00			0.00			-24787.04		
2	ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECCONSA" CIA.LTDA.	-16820.64	=	-1330.75	-27485.58	=	-2174.49	-16820.64	=	2.02
		12.64			12.64			-8316.35		
3	CONSTRUCTORA COTRASIERRA CIA.LTDA.	8674.56	=	0.10	-48.22	=	0.00	8674.56	=	0.46
		86474.56			86474.56			18855.56		
4	CONSTRUCTORA WILSON ROMERO ALDAS WILROMA CONSTRUCTORA CA	-4107.71	=	-108.76	-4238.51	=	-112.22	-4107.71	=	3.99
		37.77			37.77			-1028.33		
5	AINNCA CIA.LTDA.	859.23	=	0.03	90.41	=	0.00	859.23	=	0.07
		28839.87			28839.87			11744.18		
6	ES&YCONSTRUCTORA CIA.LTDA.	0.00	=	-	0.00	=	-	0.00	=	0.00
		0.00			0.00			400.00		
7	CONSTRUCTORA SANTILLAN RIVERA CIA LTDA	0.00	=	0.00	17452.52	=	1.05	0.00	=	0.00
		16639.33			16639.33			83755.90		
8	CONSTRUCTORA HIDROESTRUCT SA	0.00	=	-	1265.42	=	-	0.00	=	0.00
		0.00			0.00			11810.11		
9	CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA.	0.00	=	-	0.00	=	-	0.00	=	0.00
		0.00			0.00			1000.00		
10	CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.	0.00	=	-	0.00	=	-	0.00	=	0.00
		0.00			0.00			1000.00		
eleven	COSMACOR SA	0.00	=	-	0.00	=	-	0.00	=	0.00
		0.00			0.00			22365.09		
12	CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA.	0.00	=	-	0.00	=	-	0.00	=	0.00
		0.00			0.00			1000.00		
13	CONSTRUCTORA RAMIAND SA	0.00	=	-	0.00	=	-	0.00	=	0.00

		0.00			0.00		800.00		
14	PROMAGNUS CONSTRUCCIONES CIA. LTDA.	0.00	=	-	0.00	=	0.00	=	0.00
		0.00			0.00		2000.00		
fifteen	AMG CIVIL CONSTRUCTIONS CIA.LTDA.	0.00	=	-	0.00	=	0.00	=	0.00
		0.00			0.00		1000.00		
16	GENERSERVIX SAS	0.00	=	-	0.00	=	0.00	=	0.00
		0.00			0.00		1000.00		
17	REAL ESTATE CONSTRUCTING-DREAMS SAS	0.00	=	-	0.00	=	0.00	=	0.00
		0.00			0.00		11000.00		
18	PLPREMIUN SA	0.00	=	-	0.00	=	0.00	=	0.00
		0.00			0.00		2000.00		

Note. This table shows the results obtained by applying the profitability indicator using the operating margin, net sales profitability, and operational profitability of equity indices applied to the 18 construction microenterprises with the information obtained from the year 2022.

By applying profitability indicators such as operating margin indices, net sales profitability and operational profitability of equity applied to the 18 construction microenterprises, it was possible to determine the level of profitability of the entities, as detailed below.

Through the application of profitability indicators to the microenterprise CONSTRUSULTANA CIA.LTDA., the following results were obtained: because the entity did not carry out any economic activity that generated results, the operating margin and net profitability indicators were not applied. of sales, in the equity operational profitability indicator a result of 0 was obtained, indicating that for every dollar of own resources it generates 0% of operating profit, for the same reason of not having carried out any economic activity.

The operating margin of the microenterprise EMPRESA CONSULTORA & CONSTRUCTORA ASOCIADOS "ECCONSA" CIA.LTDA for the year 2022 was -1330.75, meaning that for every dollar of sales it generated -1330.70 USD of operating loss. The net sales profitability of the microenterprise was -2174.49, meaning that, for every dollar of sales, once its costs, expenses and interests were deducted, it generated a net loss, because the income generated by sales is insignificant compared to the loss. obtained during the period. The operational profitability of the microenterprise's equity was 2.02, this is because the equity and operating profit are negative, indicating that, instead of helping to reduce the loss of equity, it decreases it by 202%.

Applying the profitability indicator to CONSTRUCTORA COTRASIERRA CIA. LTDA. An operating margin of 10% could be determined for the year 2022, this indicates that for every dollar of sales, 10% of operating profit was generated. However, the net sales profitability of the microenterprise was -0.001, meaning that for every dollar of sales, once its costs, expenses and interests

have been deducted, it does not generate any net profit. This was because the net profit was negative. compared to the level of sales obtained, that is, the entity obtained more costs and expenses than income. The operational profitability of equity was 0.46, meaning that for every dollar of equity it generates 0.46 dollars of operating profit, without considering taxes and expenses.

The operating margin of the microenterprise CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA for the year 2022 was -108.76, meaning that for every dollar of sales it generated -108.76 USD of operating loss, indicating that it incurred costs that exceeded the income obtained. in the period. The net sales profitability of the microenterprise was -112.22, meaning that for every dollar of sales, once its costs, expenses and interest have been deducted, it generates -112.22 loss. The operational profitability of equity was 3.99, this is because equity and operating profit are negative, indicating that, instead of helping to reduce the loss of equity, it decreases it by 399%.

The operating margin of the microenterprise AINNCA CIA.LTDA. In 2022 it was 0.03, meaning that for every dollar of sales it generated 0.03 USD of operating profit. The net profitability of sales of the microenterprise was 0.00, meaning that for every dollar of sales, once its costs, expenses and interests have been deducted, it does not generate any net profit. The operational profitability of equity was 0.07, meaning that for every dollar of equity it generates 7% of operational profit, without considering taxes and expenses.

Through the application of profitability indicators to the microenterprise ES&YCONSTRUCTORA CIA.LTDA., the following results were obtained: because the entity during the analyzed period did not carry out any economic activity that generated results, the margin indicators were not applied operational and net profitability of sales, in the indicator of operational profitability of equity a

result of 0 was obtained, indicating that for every dollar of own resources it generates 0% of operating profit, for the same reason of not having carried out any economic activity.

The operating margin of the microenterprise CONSTRUCTORA SANTILLAN RIVERA CIA LTDA for the year 2022 was 0.00, meaning that for every dollar of sales it did not generate any operating profit. The net profitability of sales of the microenterprise was 1.05, this is because the net profit is not from the operational activity of the microenterprise but is generated by the sale of fixed assets. The operational profitability of equity was 0.00, meaning that for every dollar of own resources it does not generate operational profit, because in the period analyzed the entity did not carry out any economic activity.

In the case of the microenterprises detailed below: CONSTRUCTORA HIDROESTRUCT SA, CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA., CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA., COSMACOR SA, CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA., CONSTRUCTORA RAMIAND SA, PROMAGNUS CONSTRUCCIONES CIA. LTDA.,

AMG CONSTRUCCIONES CIVILES CIA.LTDA., GENERALSERVIX SAS, INMOBILIARIA CONSTRUCTING-DREAMS SAS and the construction company PLPREMIUN SA, the operating margin and net sales profitability indicators could not be applied, due to the fact that in the period corresponding to the year 2022 These microenterprises did not carry out any economic activity that generated results, with respect to the indicator of operational profitability of equity, the value obtained was 0, this was the same as in the other indicators because the entity did not carry out any economic activity nor did it obtain an operating profit. In the period analyzed, however, the entity has equity, thus indicating that for every dollar of its own resources it does not generate operational profit.

Hypothesis testing

To verify the hypothesis, a general summary of the projections obtained through the Ohlson model O3, O2 and O1 applied to the years 2020, 2021 and 2022 respectively, was carried out. This information was run in the SPSS program for its respective verification as can be seen below:

Table 16. Comparison of results from the application of the Ohlson Model.

COMPARISON OF THE RESULTS OBTAINED USING THE OHLSON MODEL							
No.	Company	Result	Model	Result	Model	Result	Model
		2020	O3	2021	O2	2022	O1
1	CONSTRUSULTANA CIA.LTDA.	Projects instability	45.03	Projects instability	40.74	Projects instability	27.19
2	ASSOCIATED CONSULTING & CONSTRUCTION COMPANY "ECONSA" CIA.LTDA.	Projects instability	7.76	Projects instability	1.04	Projects instability	7.83
3	CONSTRUCTORA COTRASIERRA CIA. LTDA.	Projects instability	4.28	Projects instability	4.05	Project stability	- 1.45
4	CONSTRUCTORA WILSON ROMERO ALDAS WILROMACONSTRUCTORA CA	Projects instability	26.47	Projects instability	5.83	Projects instability	3.13
5	AINNCA CIA.LTDA.	Project stability	- 26.10	Projects instability	2.43	Project stability	- 11.02
6	ES&YCONSTRUCTORA CIA.LTDA.	Project stability	- 0.14	Projects instability	2.18	Project stability	- 2.18
7	CONSTRUCTORA SANTILLAN RIVERA CIA LTDA	Projects instability	3.48	Projects instability	2.85	Projects instability	0.50
8	CONSTRUCTORA HIDROESTRUCT SA	Projects instability	0.39	Project stability	-0.48	Project stability	- 3.84
9	CONSTRUCTORA RIOBAMBA RIOCONSTRUC CIA.LTDA.	Project stability	- 0.22	Projects instability	0.94	Project stability	- 3.14
10	CONSTRUCTORA HARO MACHADO HAROMACHADO CIA.LTDA.	Project stability	- 0.14	Projects instability	0.79	Project stability	- 3.14
eleven	COSMACOR SA	Project stability	- 0.07	Projects instability	0.49	Project stability	- 2.37
12	CONSTRUCTORA VILLAVICENCIO & CEPEDA VILLACEPE CIA.LTDA.	Projects instability	10.08	Projects instability	10.40	Project stability	- 3.14
13	CONSTRUCTORA RAMIAND SA	Project stability	- 3.47	Project stability	-0.28	Project stability	- 3.10
14	PROMAGNUS CONSTRUCCIONES CIA. LTDA.	Project stability	- 0.26	Project stability	-0.54	Project stability	- 3.26
fifteen	AMG CIVIL CONSTRUCTIONS CIA.LTDA.A262	Project stability	- 0.33	Project stability	-0.38	Project stability	- 3.14

16	GENERSERVIX SAS			Project stability	-0.25	Project stability	- 3.14
17	REAL ESTATE CONSTRUCTING-DREAMS SAS			Project stability	-0.90	Project stability	- 3.55
18	PLPREMIUN SA			Project stability	-0.53	Project stability	- 3.26

Note. Comparison between the Ohlson models O3, O2, O1 and the stability projection obtained

Figure 2. Normality tests
Pruebas de normalidad

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Estadístico	gl	Sig.	Estadístico	gl	Sig.
O3 2020	.276	18	.001	.742	18	.003
O2 2021	.323	18	.003	.479	18	.000
O1 2022	.286	18	.004	.639	18	.002

a. Corrección de significación de Lilliefors

Note: Normality tests were processed in the SPSS program, using the data obtained from the application of the model under study.

Once the normality tests were applied, it gave us the sig values. or p-value less than 0.05, violating the condition of normality, which must be greater than 0.05, indicating that they are non-parametric data, which is why the Kruskal-Wallis tests were applied, because These are independent samples and the financial information analyzed is from three different years 2020, 2021, 2022.

Figure 3. Non-parametric tests

	Hipótesis nula	Prueba	Sig.	Decisión
1	La distribución de Puntaje O es la misma entre las categorías de AÑOS.	Prueba de Kruskal-Wallis para muestras independientes	.1083	Retener la hipótesis nula.

Se muestran significaciones asintóticas. El nivel de significación es de .05.

Note: Non-parametric tests were processed in the SPSS program, the Kruskal-Wallis Test was used.

Using the data obtained in the SPSS software, the result was 0.1083, a value greater than 0.05 and the null hypothesis was accepted, which was formulated as follows: The Ohlson model O3, O2 and O1 projects different economic stability in the years 2020, 2021 and 2022 in microenterprises in the construction sector of the city of Riobamba.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Through the application of the Ohlson O3 model, which projects stability for three years from now, starting from the year 2020, when the financial information was analyzed, the O2 model, which projects stability for two years from now, starting

from the year 2021, when the financial information was analyzed, financial information and the O1 model that projects stability for one year from 2022, which analyzed the financial information of the 18 microenterprises in the construction sector of the city of Riobamba. It was concluded that: through the O3 model applied to the financial statements for the year 2020, 8 construction microenterprises project economic stability because they have the necessary resources to meet their obligations with third parties. In addition, they obtained positive results during the period analyzed. , while 7 microenterprises project future instability. When applying the O2 model to the financial statements corresponding to the year 2021, it was determined

that of the 18 microenterprises analyzed, 7 construction companies project stability, the remaining 11 project future instability, this is due to the fact that in 2021 some entities contracted more current obligations and the results of the financial year were not positive. With the application of the O1 model to the financial statements corresponding to the year 2022, it was determined that 14 construction microenterprises project economic stability, the remaining 4 construction companies project the probability of presenting future instability. These results are mainly due to the low profitability and level of debt presented by construction microenterprises.

In general terms, it can be noted that by applying the O3 model, 44% of microenterprises project economic stability, according to the O2 model, 39% of microenterprises project economic stability, and according to the O1 model, 78% of microenterprises project economic stability, on average. Through the application of the Ohlson model, 54% of microenterprises project economic stability and 46% project economic instability in the future.

Through the use of liquidity, solvency and profitability indicators applied to the financial information for the year 2022 of the 18 construction microenterprises in the city of Riobamba, it was possible to determine their current economic situation, concluding that: 3 of the 18 microenterprises construction companies in the city of Riobamba do not have sufficient liquidity to cover their obligations with third parties, while the remaining 15 can meet their current liabilities, with

respect to the level of debt of the assets, 4 microenterprises reflect a result greater than 50%, of the other 14 entities, the level of debt is less than 50%, in the debt of equity, 5 microenterprises have a level of debt greater than 50%, in addition, through the profitability indicators it was determined that 4 construction microenterprises reflect a level of margin operational margin less than 10%, while only one microenterprise reaches the operational margin of 10%, the indicator of net sales profitability indicates that 4 construction companies obtained negative results during the period and the indicator of operational profitability of equity indicates that only 2 entities generate positive results.

In general terms, it can be concluded that the current economic situation of construction microenterprises is worrying due to the lack of liquidity, the level of debt in certain entities is too high that even the equity is negative and with respect to profitability it can be determined that none exceeds 10% in profitability.

2.3 recommendations

It is recommended that microenterprises in the construction sector of the city of Riobamba apply the indicators of the Ohlson model to project the future stability of the entities and thus make corrective decisions in time.

It is suggested that microenterprises know their current real financial situation by applying debt indicators in order to measure their liquidity and profitability capacity before seeking external financing.

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