Riesgo financiero para las empresas listadas en la bolsa de valores de lima entre 2016 y 2018

Financial risk for companies listed on thelima stock exchange between 2016 and 2018

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RESUMEN
El riesgo financiero se evaluó mediante un modelo probabilístico, con base en los riesgos de liquidez, deuda y cartera de las empresas que cotizan en la Bolsa de Valores de Lima, y que reportaron los estados financieros a la Superintendencia de Bolsa de Valores (SMV), para los años 2016, 2017 y 2018. Dicho análisis de riesgo se realizó en términos de la variable "dummy", para 174 empresas peruanas. Posteriormente, se aplicó el modelo LOGIT, junto con pruebas e hipótesis econométricas específicas, para evaluar la consistencia y confiabilidad del modelo.
Se determinó que el año que presentó mayor riesgo financiero fue 2017, siendo el sector terciario el que presenta mayores tasas de riesgo. De las 174 empresas observadas, más del 80% de las mismas presentó riesgo de recuperación de cartera, como riesgo de mayor frecuencia, para los tres años, seguido por el del sector de observación.

Palabras clave: riesgo financiero, riesgo de recuperación de cartera, riesgo de liquidez, riesgo de endeudamiento.

ABSTRACT
Financial risk was evaluated through a probabilistic model, based on the liquidity, debt, and portfolio risks of the companies listed on the Lima Stock Exchange, and which reported the financial statements to the stock market superintendence (SMV), for 2016, 2017, and 2018. Said risk analysis was carried out in terms of the "dummy" variable, for 174 Peruvian companies. Subsequently, the LOGIT model, together with specific econometric tests and hypotheses, were applied to evaluate model consistency and reliability.
It was determined that the year which presented highest financial risk was 2017, the tertiary sector being that with the highest risk rates. Of the 174 companies observed, over 80% thereof presented portfolio recovery risk, as the highest frequency risk, for the three years, followed by that of observation sector.

Keywords*: financial risk, portfolio recovery risk, liquidity risk, indebtedness risk.*

1 INTRODUCTION

The present dynamic of financial risk at the global level, has been characterized by constant changes and by high market uncertainty levels. Some studies indicate that “moments of risk” have been experienced recently, as market globalization has caused events in one region or country to indirectly affect other regions, or even the rest of the world, due to economic interrelationship. The following are examples of said moments of risk: the devaluation of the Mexican peso (Tequila Effect, 1995); Asian Crisis (Dragon Effect, 1997), devaluation of the real in Brazil (Zamba Effect, 1999), fall of the North American NASDAQ index (2000), economic slowdown in the United States and general increase in energy prices (2001), collapse of the Argentine economy (Efecto Tango, 2002), financial economic crisis (2008). In each of these situations, uncertainty has been present, and it has been essential to assess the risk that these situations imply. Said elements lead to the reflection of Pascal (Pascal, 1999), that: "the world from a financial point of view, it is a riskier place”. From the above arise the needs for new methods, procedures, and models to measure and control increasingly complex risks.

Around the world, small and medium-sized companies constitute the bulk of businesses, in numerical terms. According to the Central Business Directory (DIRCE), as of January 1, 2016, there are 3,232,706 companies in Spain, of which 99.88% are MSMEs (between 0 and 249 employees). As a result, it is necessary to investigate and learn the risks to which these companies are exposed, to generate instruments would allow them to act opportunely. There are few studies in this field, and research is nonexistent in context analyzed herein, particularly in the areas of liquidity, debt, and portfolio management.

Similarly, this topic also requires additional examination because small and medium-sized companies do not usually have (a priori hypothesis) financial departments that would perform complete and adequate monitoring of the various risk indicators, and use these conclusions, make relevant decisions and apply strategies conducive to mitigating those risks in which they are immerse, as indicated by Miller (1994).

Specifically, financial risk is a term introduced into modern theory by Markowitz (1952), in his article, “Portfolio Selection: Efficient Diversification of Investments”, published in The Journal of Finance, it encompasses the possibility of any event which might occur, that could result in negative financial consequences. A whole field of study has been developed around financial risk to reduce its impact on companies, investments, commerce, etc. Risk can also be understood as the possibility that the benefits obtained are lower than those expected, or that there is no return at all.

Mascareñas (2008) defines risk as the uncertainty associated with return on investment, due to the possibility that the company may not meet its financial obligations (mainly, interest payment and debt amortization). On the other hand, it is important to mention that companies face different financial risks, which vary in accordance with company and activity types. Specifically, they can be classified into

systematic (market, exchange, legal, transaction, translation, economic, among others) and non-systematic risk (interest rate, insufficient equity, operating, indebtedness, liquidity, among others) categories (Lewent (1990), Fragoso (2002), Jorion (1999), Baca (1997), Díaz (1996), Ayala (2005)).

Once the risks to which a company may be exposed have been defined and reviewed, the next step is to administrater or manage said risk. In modern financial theory, authors such as Bodie & Merton (1999), in portfolio theory, conceptualize risk management as the quantitative analysis of optimal risk management. Its application consists of formulating and evaluating trade-offs between risk-reduction benefits and costs, in order to arrive at an optimal decision.

Once this conceptualization has been carried out, it is importantto observe what is the behavior of financial risk in the companies listed on the Lima stock exchange. This investigation aims to offer elements that would provide companies tools that balance the results of calculated indicators, and which have controllable risk. According to San-Martín-Albizuri & Rodríguez-Castellanos (2011), the current crisis has revealed the close interrelationship of three aspects inherent to the development of financial markets in recent decades: the globalization process, volatility of financial magnitudes, and uncertainty.

Peru as the context for the companies under study, and a Latin American country, follows the same trend in business composition. The vast majority are family businesses and SMEs, as reflected in the latest data published by the Peruvian National Institute of Statistics and Informatics (INEI 2019). With regard to private formal employment, for the year 2019, the unemployment rate was expected to continue to decrease, as in the previous year, and growth of 3.7% was expected in the number of workers registered in electronic spreadsheets, a figure equal to that registered in 2018.

On the business level, improvements in the margins of large companies were expected, as was the implementation of mining projects, and growth of the trade and services sectors, although not if the fishing sector is important for the country's economy. Among the risks that the Peruvian economy might face was the stagnation of China as a commercial power and Peru’s foremost commercial partner, a lack of institutional framework, and political instability, which is the result of corruption in the Judiciary, and confrontation or separations in congressional political parties.

2 METHODOLOGY

The investigation presented herein is a quantitative case study with empirical measurement, not only because of the size of the observed population, but also because of the inference level that can be gleaned from the results. It only describes financial risk behavior in certain companies listed on the Lima Stock Exchange.

The population under study encompasses 273 companies in the database reported by the Superintendency of the Securities Market (SMV), and is complemented by information published by the

Lima Stock Exchange (BVL). The information and financial statements for 193 companies, which continuously reported their information throughout 2016, 2017, and 2018, was filtered.

This study may be defined as a multi-centric macro project, in an initial phase, previous studies were implemented in som citys of Colombian capital cities, where the model was applied for measurement and its respective econometric validation. There was also a previous study conducted in Spain, with the companies listed on the stock exchange and Spanish markets, Mexico, with companies of the Mexican Stock Exchange.

The following working hypotheses were raised:

H_1. The liquidity, indebtedness, and recovery of portfolios negatively influence the financial risk of companies listed on the Lima Stock Exchange.

H_0 The liquidity, indebtedness, and recovery of portfolios do not negatively influence the financial risk of companies listed on the Lima Stock Exchange.

In the first phase of the macro project, a pilot test was carried out, both to refine the methodology, instruments, and data applied, and to establish reference values through central tendency statistical data, with which the presence of risk was determined. In the case of Peru, the value was the following: liquidity 2.73. This reference value used is not very far if we return to that expressed by Altman (1968). For portfolio recovery, a company has portfolio management risk when the result of the portfolio recovery calculation yields a value of greater than 60 days, and whose value, with the "dummy" variable, is 1. A company has debt risk when the result of the calculation is greater than 51%, since it compromises capital adequacy, and the value assigned for the "dummy" variable is 1.

For the calculations of debt and portfolio recovery risks, formulations of conditional Yes were made, allowing the model and its dispersions to be smoothed. This formulation, in the case of the portfolio, was carried by all the values of those companies that provide over 360 days of recovery, presenting atypical data in the model, and also exceeding the maximum accounting period (portfolio greater than 360 days).

Once each risk was calculated (liquidity, debt, and portfolio recovery), these results were converted into risk terms, as a dichotomous or dummy variable, defined as 1, if the company has financial risk, and 0, if the company has no risk or no risk. This occurred via a conditional model and generation of a risk table, and risk was determined under the following premise or criteria: if the sum of the three individual risks was equal to or greater than 2, then the company had risk (1), and companies with two or three of the indicators in no risk conditions (0), had no financial risk (0).

Once company financial risks were calculated, a descriptive analysis of risk behavior was carried out, by type of company and productive sector, in accordance with conglomerate, by cluster analysis.

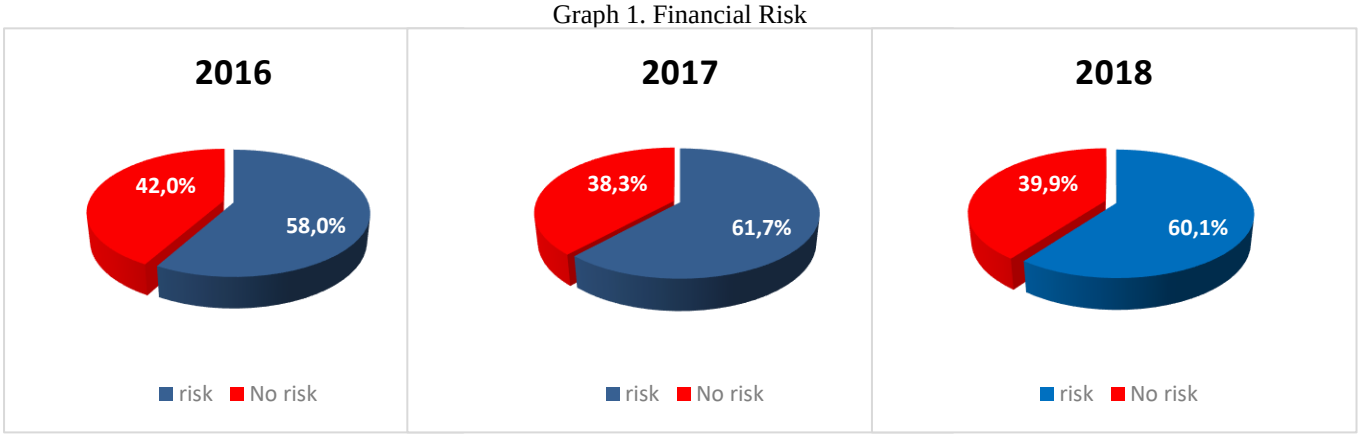
Finally, the database was verified and validated, and the independent variables used to explain variations of the dependent variable (no financial risk, financial risk) were clarified, using econometric techniques to determine and quantify risk exposure (Uribe , 2015). The SPSS program was used to run the

Logit model, which allowed for establishment of the goodness, consistency, and reliability of the model, acceptance or rejection of the work hypothesis, and prediction of possible financial risk behavior.

3 RESULTS

The following is an analysis of the results obtained, after data processing, based on basic financial statements: cash flow, balance sheet, and profit and loss statement, as reported to the Superintendency of the Securities Market (SMV) and Lima Stock Exchange (BVL).

Graph 1. Financial Risk



Source: Author elaboration.

On implementation of this evaluation, it was found that over half of companies, in 2016, presented financial risk. Since then, as shown in Graph 1, 42% did not present financial risk, in contrast to 58% of companies with financial risk. In 2017, the same occurred: over half of the listed companies on the Lima Stock Exchange presented financial risk, with a participation of 61.7%. With respect to a non-presence of risk of 38.3%, in the same way for 2018, the financial risk participation is lower than that presented for 2017. When obtaining participation of 60.1%, a reduction of 1.6 percentage points, over half of the listed companies presented this type of risk.

Similarly, it should be noted that the highest peak found with this type of risk, in the analyzed period, occurred in 2017, with an increase in risk from 2016 to 2017 of 3.7% in the risk share for these companies. Note that, in accordance with the results of this study, it was observed that, for 2016, 2017, and 2018, listed companies all presented risks in the same proportions for the three years, with an average of 33%.

Table 1. Financial risk by sector.

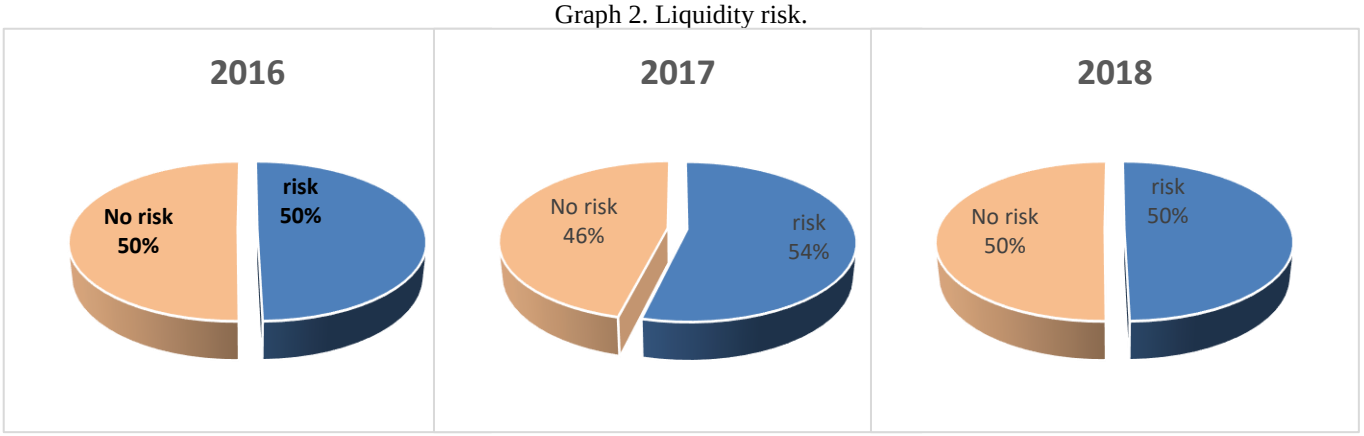
	RISK PRESENT			RISK FREE		
SECTOR	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
PRIMARY	12	12	10	11	11	13
%	35.29%	35.29%	29.41%	32.35%	32.35%	38.24%
SECONDARY	23	21	25	22	24	20
%	33.33%	30.43%	36.23%	31.88%	34.78%	28.99%
TERTIARY	48	55	52	77	70	73
%	30.97%	35.48%	33.55%	49.68%	45.16%	47.10%

Source: Author elaboration.

Table 1 shows the financial risk for each sector, by number of companies and participation percentage, as compared to the 193 companies studied. Risk was analyzed both within the sectors and in the various years under study. The percentages showed that all sectors, proportionally, present the same level of risk, with an average of 33.3% per sector, during the three years examined. Montoya, s.f. states that, “The economic sector of the manufacturing industry, handicrafts, community services and transformation of primary sector products into new products and consumer goods in Peru, as in most countries, is the second largest in the economy It also drives a large part of the country's economic growth, close to 50% of it ”. For example, in January of 2018, according to data from the INEI (National Institute of Statistics and Informatics of Peru), in its bulletin for the first quarter of 2019, regarding the behavior of the Peruvian economy, during 2018, the secondary transformation sector took first place, with 6% of global supply and demand, in relation to the country's GDP. Manufacturing was third in terms of participation in GDP during 2018, with 6.2%. This type of sector is characterized by the latent need to constantly innovate and invest, in order to improve processes. For this reason, it is subject to greater risks, thanks to the constant financial movement generated to leverage these activities.

Regarding the primary sector, there is evidence of a decrease in the percentage of companies with considerable risk. This explained by the nature of these sectors and the minimal financial mobility they possess. For example, in the agri-food and rural sector, the sector's low capitalization is evident, and isderived from the lack of investment of rural productive units, in productive assets, such as private infrastructure, machinery, and equipment, and also in fixed assets and scant incorporation of agricultural technologies and technical models (De Olloqui and Fernández, 2017). The lack of investment in these types of assets generates little productivity or financial dynamism in the sector, due to having insufficient financing access, for example, in the case of Peru, access to credit could increase agricultural productivity by 26%, and profits by between 17% and 27% (De Olloqui and Fernández, 2017).

Graph 2. Liquidity risk.

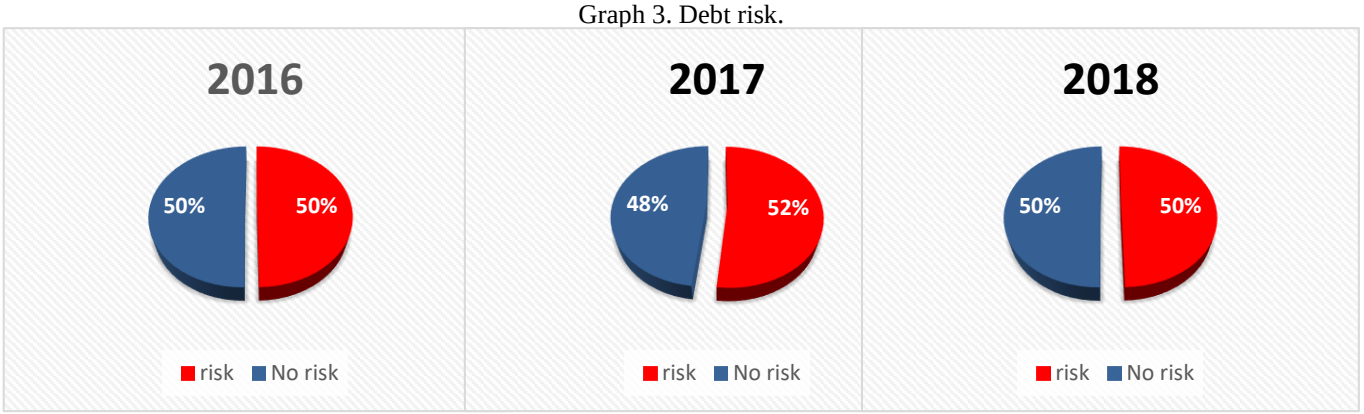


Source: Author elaboration.

In a second phase, individual risks were analyzed. This began with liquidity risk, which reveals whether companies, after paying its short-term obligations, still have working capital and investment resources. As shown in the graphs for 2016, 2017, and 2018, almost half of the companies under study were liquid. In 2016 and 2018, 50% of the companies listed on the Lima Stock Exchange had liquidity risks, and only in 2017 did the risk increase above 50%.

For the analysis by sectors, risks were determined by means of the same sectors, with liquidity for the primary sector at an average of 1.22, for the secondary sector, 1.6, and for the tertiary sector, 1.17. The tertiary sector had the highest number of companies at risk over the three years of observation, representing 60% of all companies. Additionally, note that the tertiary sector, during the three consecutive years, generated minimal increases, while in the primary sector, companies with liquidity risks increased for the year 2017, this increase may have been due to the slowdown of the economy, as a consequence of the fall in the international price of raw materials, among these, copper, a product of great importance for Peruvian exports.

Graph 3. Debt risk.



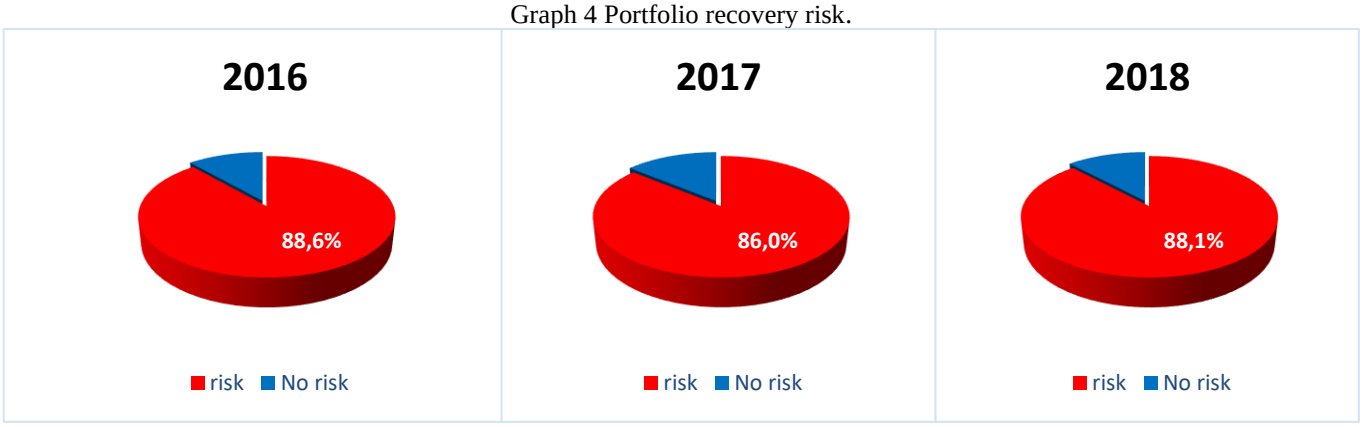
Source: Author elaboration.

The debt risk analysis also reveals the ways in which company equity sufficiency was compromised. The results obtained were based on the calculations carried out, and reflected the same liquidity risk trend. Over the three years of observation, risk was or exceeded 50%, with 2017 at 52%, the

year that presented the highest number of companies with debt risk.

For the risk of indebtedness, the medians defined to determine risk values were 42% for the primary sector, 43% for the secondary sector, and 59% for the tertiary sector. The debt risk graph shows that the primary sector continued to be that with the lowest number of companies at risk, during 2016 and 2017. Approximately the same level of indebtedness remained, with a slight increase for 2018. This may be explained by the growth of the Peruvian economy, by 2.81%, in January of 2018, in accordance with figures from the National Institute of Statistics and Informatics (INEI). This result is associated with the favorable evolution of external demand, reflected in higher exports (13%), both of traditional (12.8%) and non-traditional products (13.5%). On analysis of the secondary sector, it was observed that, although the risk was higher than the primary sector, there was a stable trend throughout the three years of observation. Finally, in terms of the tertiary sector, this not only continued to have the largest number of companies exposed to risk, but also demonstrated slight growth year after year. This might be explained by Peruvian economic improvement, and the need for working capital to supply the demand. Likewise, it was determined that this increase was most likely due to the fact that the service sector, in the respective year, employed approximately 6.5 million workers, representing an increase of 3.6%.

Graph 4 Portfolio recovery risk.



Source: Author elaboration.

As shown in the graphs for each year, the risk of portfolio recovery was high: for the three years under observation, it was above 80%. The years 2016 and 2018 had the highest number of companies at risk, and the above shows that Peruvian companies have managed their portfolios poorly in recent years. This is very risky because most companies collect in timeframess exceeding 60 days, but because this, in turn, affects liquidity and adds to their level of indebtedness by over 50%, and additionally compromises company capital adequacy.

Regarding the risk of portfolio recovery, the average values determining risk were 434 days, for the primary and secondary sector, and 545 days for the tertiary sector. As shown in the graph, the primary and secondary sectors showed the same trend in both numbers and behavior towards risk during the three years of observation, while the tertiary sector continued to be that with the most companies with risk. The data

with which the different graphs were made indicate that most companies that belong to the tertiary sector form part of the financial services sector, therefore, these companies' corporate purposes include the placement of resources to finance third parties, especially in the long term. This have skewed the results found. Were this the case, it would be recommended that said data be cleaned up, in order to specifically analyze short-term portfolio management in said type of organization (360 days), as well as the medium (1,800 days) and long term (7,200 days). The secondary sector increased, by 17 companies, from 2016 to 2017. The primary sector remained relatively stable.

4 ECONOMETRIC TESTING AND ANALYSIS

Following the risk analyses performed, the same data from model variables were used to apply a logit regression and various econometric tests that validate model fit, consistency, and goodness, as well as the hypothesis test. As show, all data from the study population were included in the model, and there were no missing cases.

Table 2. Case Processing Summary

Unweighted cases [a]		N	Percentage
Selected cases	Included in the analysis	193	100,0
	Lost cases	0	,0
	Total	193	100,0
Unselected cases		0	,0
Total		193	100,0

a. If weighting is in effect, see leaderboard for total number of cases.
Source: Author elaboration.

It can be seen how the adjustment of the model better and correctly classifies companies with financial risk by 99.1% for 2016 and 100% for 2017 and 2018. Likewise, the global percentage of company classification was 98.4% for 2016 and 99.5% for 2017 and 2018.

On the other hand, as compared to the analysis of the proposed hypothesis, show the results of the Wald significance test, which is less than 0.05 for the three years studied, this allows for the rejection of the null hypothesis for this study. The bivariate analysis is shown, between predictive model variables, for which, in all cases, significance was less than 0.05, which confirms the rejection of the null hypothesis.

The Omnibus and chi square econometric tests also present appropriate significance for the three years studied. These show a model adjustment for the variables used. The Negelkerke econometric tests also yielded significance, with the exception of the Cox and Snell test, whose significance was slightly high for said three years. The model presents a good likelihood and fit of the model for the variables used.

Table 3. Omnibus tests of model coefficients

		Chi- square	gl	Sig.
Paso 1	Paso	238,763	3	,000
	Block	238,763	3	,000
	Model	238,763	3	,000

Source: Author elaboration.

With the Hosmer and Lemeshow tests, which are more exact tests of model goodness of fit, the predicted (expected) values were compared, by the model, with observed values. The null hypothesis of the Hosmer-Lemeshow test is that there are no differences between the observed and predicted values. The rejection of this test would indicate that the model was not well adjusted. The results shown in the table for those three years, in terms of the significance value, prompt acceptance of the test's null hypothesis, which confirms that the model fits the data well, in accordance with the test summary and 2x2 table, with greater precision in financial risk data.

Finally, compared to the proposed model, the Wald test allowed for the determination that all the variables used were predictors of financial risk, thanks to the significances shown, with greater consistency, mainly during 2016, in the liquidity risk variable.

Table 4. Test of Hosmer y Lemeshow

gl	Sig.
3	1,000

Source: Author elaboration.

For the three years, the variable that showed the least favorable results, as compared to its prediction level, was indebtedness, as reflected in its significance. Pearson's chi-square permitted rejection of the null hypothesis, since its value was less than 0.05, additionally it allowed for verification of the goodness of the model and the lack of discrepancy between the proposed and complete model. In turn, the plausibility test showed model goodness, which was appropriate, since all of the significances of the predictive variables were less than 0.05.

5 DISCUSSION OF RESULTS

Regarding the discussion of the results obtained, a possible consequence of the liquidity results may be due to the fact that inflation, during these years, in accordance with the Central Reserve Bank of Peru, with its economic studies management office, reached the the highest levels in twelve years. The CPI jumped from 125.72, in 2016, to 130.23, in 2018, possibly due to, among other causes, the rise in price of oil and basic foodstuffs, although unemployment remained, for said years at 4.5 %. There were also decreases in household consumption and an increase in the national production index by 5.27%, mortgage

loans increased by 8.17%, and tax collection increased by 13.8%, etc.

The INEI (National Institute of Statistics and Informatics), in bulletin issue no. 01 in January of 2019, showed how the employment rate for the observation years remained at 93% levels, keeping the unemployment rate in one-digit indices.

It is evident that company values were impacted, depending on the level of financing incorporated (Hincapié, J, 2007). Indebted companies have an additional tax expense, caused by the subsidy of the debt interest payment, an advantage that a company without debt does not have, so it is advantageous to incorporate this into company financing structures. This is a reason for financial risk companies, since financial markets present higher interest rates, as the percentage of debt increases in company financing structures. This reduces financial leverage advantages and increases the probability of the business being unfeasible.

Financial planning can be an essential tool for the achievement of objectives, the rational use of resources, and the ability to foresee different scenarios and strategies in the face of significant market uncertainty.

In the study, The Spanish Economic Crisis from 2007 (Ocon Galilea, 2013), it is concluded that the banking sector cannot grant credit and recapitalize at the same time, during periods of economic recession. For this reason, Spain is evoked to the creation of organizations focused on bank restructuring and facilitation of company access to financial institutions. Latin American markets have presented relative stability in recent years, but this does not imply that they are not exposed to falls or sudden changes. As such, companies listed on the stock market must have the healthiest possible finances that would allow it, in cases of crisis, to access credits that reactivate their production and operations, as job generators, bearing in mind that the latter becomes one of the priorities to overcome the crisis.

Regarding indebtedness, as one of the most important results of the present study, a possible cause may be the lags in the 2008 economic crisis, as a result of the so-called real estate bubble. When considered that a large part of the listed companies are from the financial sector, indebtedness is an implicit part of their corporate purpose and will have affected that which occurred with financial institutions in Spain during said crisis, as "Financial entities, subject to high competition in attracting assets, offered considerable facilities to access mortgage loans" (Spanish Economic and Social Council, 2016).

In accordance with the above, in accordance with the economic report from the Lima Chamber of Commerce (Peñaranda, 2019) in 2018, the tertiary sector represented 60.5% of the total gross domestic product, where the largest participation in said sector consisted of financial entities. However, added to the above, it primarily represents 22.2% of the GDP, and presented a growth of 35% in the past decade. This could also explain the prevalence of the risk of indebtedness, because, as is well known in this sector, mining has important participation. It had an average annual advance of 3.7% during the study period, which requires significant financing for its exploration and operation. All of the above data is very much

in accordance with the behavior of the sector in Latin America in accordance with statistical data from the Economic Commission for Latin America (CEPAL).

Therefore, companies, in the years following the crisis, may be considered to have maintained or dragged their levels of indebtedness, due to the need to reactivate and continue their operations.

Faced with the sector that presented the highest financial risk, behavior similar to that presented in studies carried out in the National Securities Market Commission of Spain was observed. There, financial risk was also more prevalent in the tertiary sector, and represented the highest percentage (Castañeda, 2019) said the director of the Institute of Economics and Business Development, who mentioned in their economic report, that in 2019, the tertiary sector represented 60.5% of the total product, with a high concentration of financial services. From the data taken from CMNV, it was determined that the sectors with the highest risk in portfolio recovery were banking, the service sector, as well as the industrial and energy sectors and was the risk with the most prevalence for Spanish companies, very similar to that found in the present study.

This may be related to that mentioned in the different situations. Their consequences have strongly affected the country's economy, and generated, in many companies, increases in employees and production, among other things, including the addition ofnew small and medium-sized companies in the market, a situation reflected in the growth of Peruvian industry, by 3.7% in 2018, despite a slight decrease during 2017, as mentioned (Arribas Barreas, Josa, Bravo Duran, Garcia Hiljding, & San Miguel Aguirre, 2016).

6 CONCLUSIONS AND IMPLICATIONS

This study provides a model that allows companies to analyze the sectors and levels of risk they face, and how they can anticipate decisions, and thus avoid adverse conditions. Companies in the region studied must be prepared for the introduction of new international regulations in the management of their operational risks, as these will have effects on credit costs and accessibility. As stated in the theory, higher bank capital requirements can translate to lower levels of credit. It is further vital to understand that one of the main obstacles for companies to access the stock market are problems of asymmetry and lack of information, since, as is well known, the financial market has multiplied the supply of instruments for the provision of business service packages broader than just credit, and thus facilitate knowledge about the financial instruments available to companies, especially smaller companies.

In relation to the results obtained, it is important to highlight that these allowed for the establishment that those companies listed on the Lima stock exchange presented financial risk for 2016, at 58% of the companies, for 2017, 61.7%, and for 2018, 60.1%. The most frequent individual risk was that of portfolio recovery, at above 80% throughout the three-year period. Additionally, taking the business classification presented by the Lima Stock Exchange as a reference, a sector analysis was carried out, in which it was possible to determine that the sector that presented the most companies with financial risk was the tertiary

sector, with a participation of 60%, over the total number of companies and the individual risk of indebtedness being the one that companies presented the most, the above being a quite sensitive sector given its impact on the GDP and the generation of employment on the national level.

Based on the statistical tests carried out, the null hypothesis H_0 may be rejected (liquidity, indebtedness and the portfolio do not negatively influence company financial risk), and in turn, the results obtained are validated against financial risk. The above results provide companies with a tool for the analysis of financial risk, in order to encourage the use of tools for the management of non-systemic or operational risks, in order to allow them to improve decision-making and remain through time.

Finally, based on the results obtained, it is suggested that collection policies be improved. This can be done through the establishment of a clear regulation to debtors, granting benefits for prompt payment that allow for portfolio recovery, having funds for creditor payments, and that the terms granted to clients are in accordance with financial needs and costs. On the other hand, companies can reduce the risk of indebtedness by searching for new and better financing alternatives, opting for credit options with longer terms that offer more competitive rates, avoiding supplier credits, as they are more expensive, conducting analyses of financing costs, looking for portfolio coverage alternatives, such as repos or factoring, adopting financing policies that offer returns above financial cost, and adjusting financing payment cycles.

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