





“Assessment of the relationship between liquidity and unprofitability of companies in preventing their bankruptcy”

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ASSESSMENT OF THE RELATIONSHIP BETWEEN LIQUIDITY AND UNPROFITABILITY OF COMPANIES IN PREVENTING THEIR BANKRUPTCY

Abstract

In 2020, due to the COVID-19 pandemic, a moratorium was imposed on launching bankruptcy proceedings for enterprises in Ukraine. It was canceled in 2022 because of the war to encourage the company management to improve the efficiency of liquidity and solvency management, seeking ways to increase companies' profitability and reduce the probability of bankruptcy. The study aims to determine the impact of liquidity on unprofitability, which can be considered an element in the management decision-making system to prevent bankruptcies of Ukrainian companies. The correlation-regression analysis was based on statistical data from Ukrainian companies for 2012–2019 and 2013–2020. The study found practically no connection between the unprofitability of Ukrainian companies and the decrease in the number of court cases in which a decision was made to recognize the bankruptcy of Ukrainian companies. On the other hand, there is a strong connection between Ukrainian companies' liquidity and unprofitability. The constructed regression equation is statistically reliable and characterized by a high level of adequacy to real economic processes and phenomena. An increase in the general liquidity ratio by 1% leads to an increase in the unprofitability of Ukrainian companies by 0.0346%. According to the company size construct, the most substantial connection is recorded for medium-sized companies (the correlation coefficient is 0.927, the coefficient of determination is 0.860, and the built correlation-regression equation is characterized by statistical reliability and adequacy). In contrast, large, small, and micro enterprises have a weak and moderate connection.

Keywords

enterprise, solvency, financial difficulties, bankruptcy, model, correlation

JEL Classification

G33, C45, M11

INTRODUCTION

The bankruptcy procedure is an instrument that makes it possible to carry out the following procedures concerning the debtor of a legal entity: disposal of property, rehabilitation, restructuring, and repayment of debts, and in the event of their impossibility, liquidation and exit from the market. The Code of Ukraine on Bankruptcy Procedures (The Verkhovna Rada of Ukraine, 2019) is aimed, first of all, at restoring the solvency of the debtor, a legal entity, and an individual. A significant threat to the functioning of any company is its insolvency crisis, which only deepens under force majeure circumstances. In these conditions, many companies face the problem of asset liquidity, insolvency, or unprofitability, which increases the probability of bankruptcy (Poliakov & Zayukov, 2022). One of the primary issues related to the bankruptcy of Ukrainian companies is that unprofitable companies seek to liquidate rather than restore their solvency.

External and internal factors influence the profitability of Ukrainian companies. Internal factors are related to the quality of company management,



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in particular, all available resources: financial, human, material, and intellectual. Today, many methods of multidimensional discriminant and regression analysis are used in practice, which, with a certain accuracy, make it possible to predict the level of unprofitability and solvency of companies and to understand which factors have a significant impact on it. The source for obtaining information regarding the assessment of the impact of liquidity on the unprofitability of companies are financial reporting forms (e.g., F No. 1 “Balance Sheet,” F No. 2 “Statement of Equity,” F No. 3 “Report on Equity Capital”). In addition, they make it possible to obtain data on volumes of non-current assets (e.g., fixed assets, unfinished capital investments), current assets (e.g., inventories, receivables, and cash), costs of future periods, equity, and current and long-term liabilities.

The accuracy of the application of correlation-regression analysis depends on the volume of the sample of objective data that allows for assessing the company’s financial condition and solvency. That is, it is crucial to obtain accurate data from the financial statements of Ukrainian companies, which should ensure the representativeness and sufficient quality of assessing the probability of financial difficulties, especially bankruptcy. However, in the conditions of Russia’s war against Ukraine, it is challenging to do this because this procedure is complicated by the fact that many companies belong to strategic ones and are obliged, according to the legislation of Ukraine, not to publish their financial statements. Therefore, it is necessary to determine which factors have the most significant influence on this level. Solving this problem will allow for the timely introduction of practical measures to increase companies’ solvency and financial stability and implement measures to prevent their unprofitability and bankruptcy (Yousuf et al., 2022).

An important direction of increasing the companies’ solvency and financial stability is ensuring the balance of their capital structure, which should be considered as a factor in increasing profitability or reducing unprofitability. The structure of the company’s balance sheet should have sufficient working capital, which will make it possible to repay its current obligations on time and ensure a smooth process of manufacturing products (providing services). After all, low liquidity carries the threat of insolvency and bankruptcy. On the other hand, high liquidity “freezes” part of the working capital, which leads to economic losses and a lack of income. That is why an essential scientific task is to assess the impact of companies’ liquidity on their unprofitability.

1. LITERATURE REVIEW

The bankruptcy procedure is understood as a series of consecutive events that begin with the company’s cash flow reduction, unprofitability, and the onset of legal grounds for the bankruptcy procedure (Turetsky & McEwen, 2001). In the market economy, unprofitable companies that do not efficiently use resources risk becoming the subject of bankruptcy proceedings. At the same time, to avoid the risk of losses for creditors, suppliers, and even the state from the debtor’s bankruptcy procedure, it is necessary to look for ways to “save” debtors and restore their solvency as much as possible. Otherwise, there will be a “domino effect”: default by the customer – deterioration of the solvency of the suppliers (creditors) – inability of creditors to pay to their own suppliers – the “avalanche” of bankruptcies (Battiston et al., 2007). It is worth emphasizing the absence of the institution of a specialized settlement agreement in bankruptcy

cases, which actually became one of the innovations of the Code of Ukraine on Bankruptcy Procedures (The Verkhovna Rada of Ukraine, 2019). This way, measures to restore the debtor’s solvency are reduced, and the risk of the aforementioned “domino effect” increases significantly.

Moreover, the possibility of a general settlement agreement concluded according to the rules of the above code cannot reduce the described risk. This settlement agreement does not correspond to the realities and tasks of the bankruptcy procedure. Among the reasons are the absence of such specialized elements as a particular method of conclusion, through a certain violation of the principle of the free will of all creditors, a special procedure for enforcement, particular legal consequences for the debtor in case of non-fulfillment of the obligations undertaken by the latter, etc. In theory, two groups of factors are distinguished that affect the unprofitability of com-

panies (financial difficulties): internal (low quality of company management, errors in the formation of financial plans, deficiencies in the management of income, and unprofitable projects) and external factors (market risks and regulatory changes) (Karels & Prakash, 1987). Based on the correlation-regression analysis with a sample of 209 Indonesian companies, it was found that such factors as liquidity, profitability, leverage, and corporate social responsibility significantly impact the value of companies (Sholatika & Triyono, 2022).

The company's aggressive working capital policy has a positive effect on profitability but a negative effect on liquidity. On the contrary, a conservative management policy has a negative effect on profitability and a positive effect on liquidity. The company's value, competitiveness, liquidity, and profitability depend on a correctly chosen working capital management strategy (Masri & Abdulla, 2018). Factors of influence (profitability, liquidity, leverage, and activity) on the onset of financial difficulties were investigated using logistic regression analysis on the example of companies in the industrial sector of Indonesia. As a result, it was concluded that liquidity, measured by the current ratio, does not affect forecasts of financial problems (Indarti & Sapari, 2020). In addition, the influence of liquidity, profitability, and company size on the dividend policy was studied. Thus, the company's liquidity has a negative and significant effect on the dividend policy but does not significantly affect the company's value (Nurhayati, 2013).

Due to the inability to compete in the market, big companies can experience financial difficulties, including losses. To assess financial difficulties, economic literature determines the influence of factors, in particular liquidity, leverage, sales volume, quality corporate management, etc. For example, in a study of companies registered on the stock exchange of Indonesia using correlation-regression analysis, it was found that the above factors, notably liquidity, do not affect financial difficulties (Dianova & Nahumury, 2019). Using logistic regression, the influence of liquidity, leverage, and operating capacity on companies' financial difficulties was investigated through profitability as an intermediate variable. Profitability and leverage have a relatively strong influence on the financial difficulties of manufacturing companies. At the same time, liquidity does not significantly affect the financial difficulties of manufac-

turing companies (Amanda & Tasman, 2019). Based on the use of logistic regression in order to identify the influence of factors on the financial difficulties of some manufacturing companies registered on the Indonesian Stock Exchange, it was found that they are influenced by leverage, liquidity, profitability, and company size. Therefore, leverage has a positive and significant impact on the financial difficulties of manufacturing companies. On the other hand, the liquidity and profitability of companies do not affect financial difficulties. Additionally, company size had a negative and significant effect on financial distress (Azalia & Rahayu, 2019).

In the conditions of economic recession, the need for effective management of working capital, particularly of stocks, becomes relevant. After all, it is possible to initiate bankruptcy proceedings in the case of an excess of liabilities over assets. For example, in Germany, §19 following the "German Insolvency Statute" (Bundesministeriums der Justiz, 1994), provides such a basis for initiating the insolvency procedure of legal entities as excessive indebtedness (non-payment) - *Überschuldung*. In England, according to Part 2 of Article 123 of the "Insolvency Act, 1986" (UK Legislation, 1986), the excess of assets over liabilities is recognized as a basis for proving the existence of a debtor's insolvency. As for Ukraine, it should be noted that there is no mention of non-payment in the regulations. At the same time, the provisions of Part 4 of Article 205 of the Code (The Verkhovna Rada of Ukraine, 2003) determine that the lack of the debtor's property to meet the creditors' demands may be grounds for declaring the debtor bankrupt. Therefore, non-payment of the debtor in Ukraine can confirm the debtor's insolvency, which is necessary for the implementation of the bankruptcy procedure (it becomes clear given the analysis of the provisions of Article 90 of the Code (The Verkhovna Rada of Ukraine, 2019). Moreover, in light of the liquidator's powers specified in Part 2 of Article 61 of the Code (The Verkhovna Rada of Ukraine, 2019), maintaining a positive balance of the company (that is, preventing non-payment) is critical for its founders. Thus, in the event of a shortage of property, subsidiary liability may be imposed on such persons, provided they are at fault in the debtor's bankruptcy.

The effect of the business cycle on the ratio of working capital to profitability is more pronounced dur-

ing economic downturns than during economic development (Enqvist et al., 2014). Bibi and Amjad (2017) studied the relationship between the company's liquidity and profitability based on correlation-regression analysis using trading and manufacturing firms in Pakistan. They concluded that the current liquidity ratio has a significant positive relationship with firms' profitability, the shares of which are listed on the Karachi Stock Exchange. The study of liquidity ratios and their impact on the profitability of banks located in Iraq showed that any increase in liquidity ratios would lead to an increase in the return on assets (Ibrahim, 2017). There is a positive relationship between capital management indicators and corporate income with capital ratios and a significant negative relationship with liquidity ratios (Gombola et al., 2016). Moreover, firms with higher earnings have lower equity liquidity (Chung et al., 2009).

There is a significant relationship between liquidity and company profitability (Thumma & Gannavaram, 2020). As already described, the lack of working capital dramatically facilitates access to the bankruptcy procedure, acting as a "sword of Damocles" both in the short and long term. In addition, working capital is necessary at every stage of the organization. Therefore, the goal of company management is to find a balance between surplus and shortage of working capital. An excess of capital increases the company's liquidity, while a shortage affects its profitability and losses (Chandra, 2020).

Reschiwati et al. (2020) analyzed banking companies to identify the influence of such factors as liquidity, company size, and profitability on the capital structure. The study showed that the listed factors significantly affect the capital structure and the value of companies.

An empirically supported hypothesis is that improving a firm's leverage makes those with low cash holdings more profit-oriented, while firms with high cash holdings are more profit-oriented (Agarwal et al., 2022). Leverage significantly affects the relationship between profitability and the cash conversion cycle. The Ukrainian legislator currently does not establish a temporal criterion for overdue liabilities (as well as non-payment). In other words, there is no distinction between temporary insolvency, which will cease to exist with the completion of the cash conversion

cycle, and permanent insolvency. Thus, long cycles of cash conversion, together with a small authorized capital and low cash reserves, significantly increase the risk of bankruptcy proceedings. In addition, the specified indicator must be considered when managing working capital, which favorably affects the profitability of organizations, especially medical ones (Dalci & Ozyapici, 2018).

Huang and Ho (2020) investigated Chinese companies. They found that the management of liquidity of their shares has a positive effect on obtaining future profits and plays a decisive role in determining the future profitability of shares. The study of Thai companies found that companies that use more liquid equity capital have an opportunity to operate with their own capital and borrow less. That is, they avoid the risk of insolvency and subsequent bankruptcy. In addition, it has been found that there is an inverse relationship between leverage and liquidity (Udomsirikul et al., 2011).

A review of literary sources shows a duality in determining the influence between companies' liquidity and their unprofitability. Some researchers believe that such a connection is weak or absent while others argue for a close corresponding connection.

Therefore, the purpose of this paper is to determine the impact of liquidity on the unprofitability of companies, which can be considered as an element in the management decision-making system to prevent the bankruptcy of Ukrainian companies.

2. METHODOLOGY

In order to study the influence of liquidity (x) on the level of the unprofitability of companies (Y), a correlation-regression analysis was applied. It solved the following tasks: established the nature and closeness of the connection between Y and x ; determined and quantitatively measured the degree of influence of x on the level of Y ; based on the actual data of the model of dependence (Y) on x calculated quantitative changes of the analyzed phenomenon when forecasting indicators and giving an objective assessment of the companies' activities. The total liquidity ratio (x) (*Total liquidity ratio*) (T_{lr}) of a company is calculated according to equation 1 (Turetsky & McEwen, 2001):

$$T_{lr} = \frac{CA}{CL}, \tag{1}$$

where CA – current assets; CL – current liabilities.

The correlation equation has the form of (Chatterjee & Simonoff, 2013):

$$Y_x = a_0 + a_1x, \tag{2}$$

where Y_x – linear trend equation; a_0, a_1 – parameters (coefficients) of the equation; t – the time factor.

The unknown parameters (a_0, a_1) are proposed to be found by the least squares method. For this, a system of normal equations is built, which is written by (Chatterjee & Simonoff, 2013):

$$\begin{cases} \Sigma y_x = a_0n + a_1\Sigma x \\ \Sigma y_x x = a_0\Sigma x + a_1\Sigma x^2 \end{cases} \tag{3}$$

The closeness of the relationship is estimated by using the linear correlation coefficient, the value of which is determined by (Chatterjee & Simonoff, 2013):

$$r = \frac{(n\Sigma yx - \Sigma y\Sigma x)}{\sqrt{(n\Sigma x^2 - (\Sigma x)^2)(n\Sigma y^2 - (\Sigma y)^2)}} \tag{4}$$

The share of variation of the studied resultant variable (Y) caused by the influence of factors (x) in-

cluded in the regression equation 2, is determined using the coefficient of determination (Chatterjee & Simonoff, 2013):

$$D = r^2 \cdot 100\%. \tag{5}$$

It is proposed to estimate the probability of the multiple correlation coefficient (as well as the correlation equation in general) by calculating the F-criterion (F) (Chatterjee & Simonoff, 2013):

$$F = \frac{R}{P-1} \bigg/ \frac{1-R^2}{n-P}, \tag{6}$$

where P – the number of parameters of the correlation equation.

In addition to the closeness of the relationship, the following indicators are used to assess the adequacy of the regression equation (2) for real processes: average error of approximation (equation 7) (Chatterjee & Simonoff, 2013):

$$\bar{\varepsilon} = \frac{1}{n} \sum \frac{|y_x - \bar{y}_x|}{y_x} \cdot 100. \tag{7}$$

The algorithm for detecting the impact of liquidity on the level of company unprofitability is shown in Figure 1.

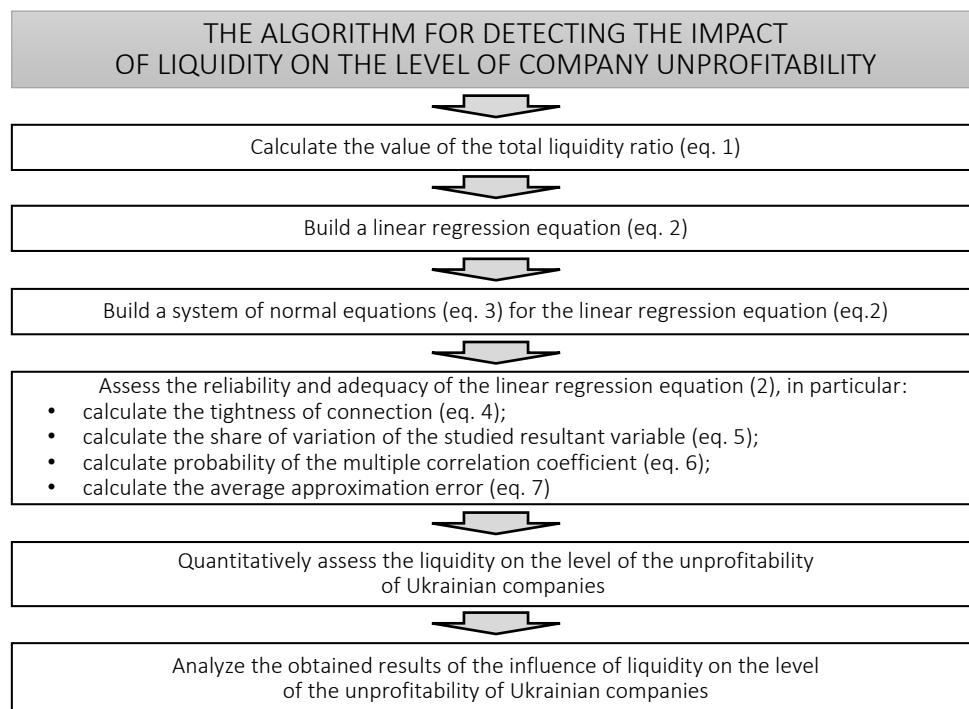


Figure 1. The algorithm for detecting the impact of liquidity on the level of company’s unprofitability

Calculations of the tightness of connection (eq. 4), the share of variation of the studied resultant variable (eq. 5), probability of the multiple correlation coefficient (eq. 6), the average approximation error (eq. 7) were carried out using the MS Excel program. To calculate the F-criterion and determine its tabular value, the appropriate functions from the statistical package of the MS Excel program were used.

3. RESULTS

The assessment of the relationship between the liquidity and unprofitability of companies in preventing their bankruptcy involves the following stages. First, an analysis of the dynamics of the unprofitability of Ukrainian companies in 2013–2020 and the level of growth (decrease) in bankruptcies of companies in 2008–2020 by individual countries of the world. Second, calculation of the general liquidity ratio of Ukrainian companies according to the data of the State Statistics Service of Ukraine, mainly according to their size. Third, the establishment of a connection between the unprofitability of Ukrainian companies and the decrease in the number of court cases in which a decision was made to recognize the bankruptcy of Ukrainian companies. Finally, the unprofitability of Ukrainian companies and the general liquidity ratio of Ukrainian companies according to their size.

3.1. Dynamics of companies' unprofitability and bankruptcy

According to the State Statistics Service of Ukraine, in 2020 the number of active subjects of economic activity in the country was 1.98 million, of which 0.0006 million were big business entities; 0.018 million – medium-sized business entities; 1.96 million – small business entities, of which 1.9 mil-

lion were micro business entities. The highest specific weight in the overall structure of all business entities is occupied by small enterprises – 98.99%, of which micro enterprises – 95.97%. Comparing the data on the number of operating companies in 2020 with 2013, in general, their number increased by 13.83% due to the increase in the number of small enterprises by 14.86%. The analysis of the dynamics of Ukrainian companies' unprofitability for 2013–2020 is shown in Figure 2.

The dynamics of the number of unprofitable companies (Figure 2) have an unstable nature of changes. For example, during 2013–2020, the highest level of the unprofitability of Ukrainian companies was in 2013, that is, every third company was actually a potential bankrupt. The main factor behind such a high level of unprofitability was the aggravation of Ukraine's political and socio-economic crisis. On the other hand, in the conditions of the shadow economy and the need for the survival of Ukrainian companies, particularly regarding hiding real incomes, individual enterprises show "losses" in their financial statements. At the same time, the total liquidity ratio of Ukrainian companies in 2013 was 1,141. Until 2015, the level of the unprofitability of Ukrainian companies decreased, and in 2015, it amounted to 26.3%; that is, every fourth company was unprofitable. From 2016, it began to rise, and in 2020, it amounted to 28.6%. The dynamics of the growth (decrease) level of corporate bankruptcies in 2008–2020 by individual countries of the world is shown in Table 1.

Analyzing the data for Ukraine, as shown in Table 1, it can be said that during 2013–2020 the number of cases in which a decree of bankruptcy was issued had a positive tendency to decrease. Thus, the highest level of decline was recorded in 2014 (–37.60%), 2018 (–35.99%), 2019 (–18.365%). These

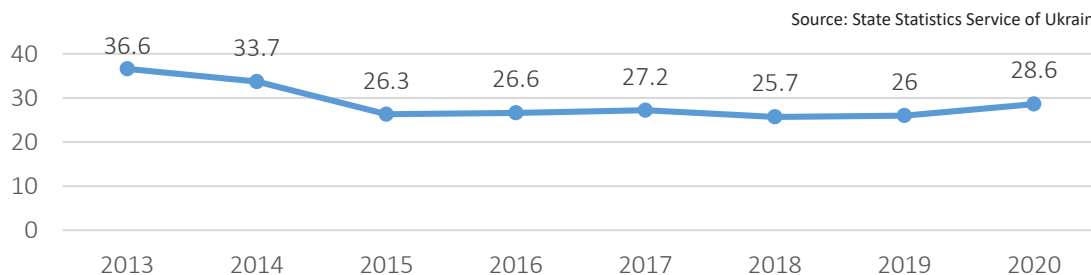


Figure 2. Dynamics of the unprofitability of Ukrainian companies in 2013–2020

Table 1. Dynamics of growth (decrease) in the level of corporate bankruptcies in 2008–2020 by individual countries of the world in % from the previous year

Source: OECD (2020), Judicial Power of Ukraine (n.d.).

Country	Year												
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Belgium	10.39	11.21	1.44	6.94	3.45	10.96	-8.69	-8.9	-6.11	8.77	-0.75	7.17	-32.09
Hungary	10.35	25.65	9.55	20.45	7.92	24.76	71.32	-24.18	-22.81	-14.44	24.34	-7.79	-39.04
Denmark	–	–	0.78	-24.97	1.03	-13.28	-21.79	19.28	16.98	1.89	6.62	6.95	-14.49
Estonia	109.41	149.41	-2.56	-39.4	-20.55	-7.27	-6.75	-12.15	-10.9	2.39	-20.41	-0.73	25.83
Ireland	78.2	103.1	11.31	1.73	-6.6	-15.03	-10.01	-18.97	-21.32	12.15	-24.58	24.86	–
Spain	185.23	75.02	-6.18	17.32	34.91	13.43	-32.21	-22.94	-15.84	0.15	1.09	11.89	–
Latvia		70.43	23.25	-66.91	-1.56	-7.24	16.95	-16.37	-8.85	-19.29	0.34	-5.41	-33.21
France	8.22	13.75	-4.53	-1.4	2.72	2.36	-0.21	0.99	-7.89	-6.18	-0.94	-6.11	-42.06
Ukraine	–	–	–	–	-24,88	-27,46	-37,6	-14,17	-23,01	-10,32	-35,99	-18,36	–

Note: For Ukraine, the data are given on the decrease in the number of court cases in which a decision was made to declare a company bankrupt; the data on the increase (decrease) in the number of bankruptcies of small companies are given for the rest of the countries.

positive trends may be related to the factor of changes in the legislation in the field of regulation of the bankruptcy procedure. In particular, in 2013, the 2011 version of the Bankruptcy Law entered into force, which provided for the abolition of the simplified bankruptcy procedure for an absent debtor, which led to positive changes. However, the decrease in “positive” dynamics in 2020 indicates the ineffectiveness of the proposed changes to the code (The Verkhovna Rada of Ukraine, 2019) and, as can be seen, the absence of a settlement agreement definitely did not bring positive changes. At the same time, in connection with the COVID-19 pandemic in 2020, a ban on opening bankruptcy proceedings was introduced, which caused a decrease in new bankruptcy cases. Therefore, this circumstance further emphasizes the low efficiency of the code (The Verkhovna Rada of Ukraine, 2019). In addition to the lack of a specialized settlement agreement, such ineffectiveness of the provisions of the code (The Verkhovna Rada of Ukraine, 2019) can be explained by the low quality of both the rehabilitation procedure and the pre-trial rehabilitation procedure. The latter naturally did not acquire the expected application and did not achieve the expected results due to its imperfect legal consolidation and regulation.

Considering the number of bankruptcies of small companies in other countries of the world, which are given in Table 1, it can be noted that the highest level was recorded in 2008 in Spain – 185.23% compared to 2007, Estonia – 109.41 %, and Ireland – 78.2%. The main reason for such bankrupt-

cies is the global financial and economic crisis. Gradually, starting from 2009, the dynamics of the number of bankruptcies of small companies in the countries listed in Table 1 is changing in the direction of their decrease. However, it is unstable in some countries. Therefore, it is positive that in 2020 the majority of these countries had a significant reduction in bankruptcies compared to previous years. Thus, in 2020 compared to 2019, the number of bankruptcies of small businesses decreased the most in such countries as France (-42.06%), Hungary (-39.04%), Latvia (-33.21%), Belgium (-32.09%), and Denmark (-14.49%).

3.2. General liquidity ratio of Ukrainian companies

Statistical data of the State Statistics Service of Ukraine (State Statistics Service of Ukraine, n.d.) were used to calculate the general liquidity ratio for all operating companies of Ukraine. Based on eq. 1, the value of the working capital of all operating companies of Ukraine in 2013–2020 was chosen, particularly by their size (large, medium, small, and micro). Thus, the value of working capital for all functioning companies in Ukraine in 2020 amounted to 7.36 trillion UAH, which is 139.84% more compared to 2013. On the other hand, the value of current liabilities in 2020 was 7.42 trillion UAH, which is 0.89% higher than the value of current assets and indicates problems with the solvency of functioning companies in Ukraine in general. During the corresponding period, the value of current liabilities increased by 176.09, i.e.,

Table 2. Calculated value of the general liquidity ratio for all functioning companies of Ukraine according to their size

Source: State Statistics Service of Ukraine (n.d.).

Year	Total	Company size			
		Large	Medium	Small	Micro
2013	1.141188	1.127339	1.131469	1.166568	1.161752
2014	1.038303	1.056705	1.081908	0.970477	0.912418
2015	0.998469	1.0234	1.015728	0.954982	0.928173
2016	0.987365	0.994373	1.010618	0.965281	0.943951
2017	0.979423	0.999008	0.983047	0.956581	0.934471
2018	0.980731	1.02273	0.936111	0.995779	0.977373
2019	0.981624	0.984241	0.962928	1.000985	0.972851
2020	0.99133	1.039374	0.975916	0.971556	0.926859
2021	1.037058	1.07141	1.028733	1.017093	0.975923

significantly more than the value of working capital by 36.25 percentage points. Table 2 shows the calculation of the general liquidity ratio for all functioning companies in Ukraine, in particular, according to their size. Calculations were made in the MS Excel program based on eq. 1.

The calculated value of the general liquidity ratio for all Ukrainian companies (Table 2) based on their size gives reason to conclude that for Ukraine, this value was within the norm only in 2013–2014 and in 2021. In 2015–2020, it was less than one, which means that Ukrainian companies had current insolvency, affecting profitability, bankruptcy, and liquidation of companies. Medium companies have more stable signs of solvency, and micro companies have unstable ones, where the calculated total liquidity ratio for the period 2014–2021 is less than one.

3.3. Relationship between liquidity and unprofitability of Ukrainian companies

In order to assess the relationship between liquidity and unprofitability of Ukrainian companies in preventing the bankruptcy of companies, a correlation-regression analysis was used using eq. 2-7 and summarizing the results in Tables 3-5. It is proposed to determine the relationship between the following factors:

- the unprofitability of Ukrainian companies and the level of decrease in the number of court cases in which a decision was made to recognize the bankruptcy of Ukrainian companies;

- the general liquidity ratio of Ukrainian companies and their unprofitability according to their size.

The assessment of the relationship between the unprofitability of Ukrainian companies (Y) and the decrease in the number of court cases in which a decision was made to recognize the bankruptcy of Ukrainian companies (x) is given in Table 3.

Table 3 shows that there is practically no connection between the unprofitability of Ukrainian companies (Y) and the level of decrease in the number of court cases in which a decision was made to recognize the bankruptcy of Ukrainian companies (x). That is, the unprofitability of a company is not the reason for the bankruptcy of Ukrainian companies, which proves the impact of the current bankruptcy legislation on the number of bankruptcy cases in which the debtor was declared bankrupt. Table 4 shows the evaluation of the relationship between the unprofitability of Ukrainian companies (Y) and the liquidity ratio for all functioning companies of Ukraine (x).

Table 4 shows a strong relationship between the level of the unprofitability of Ukrainian companies and the general liquidity ratio of all operating companies in Ukraine ($r = 0.92516$). The liquidity factor (coverage ratio) has an 85.6% influence on the level of unprofitability; other factors take the remaining 14.4%. The calculated Fisher coefficient and its comparison with the normative value ($F > F_p$) show that the calculated coefficient of determination is statistically reliable. Moreover, the calculated value of the average error of approximation proved that a high level of adequacy char-

Table 3. Relationship between the unprofitability of Ukrainian companies (Y) and the level of decrease in the number of court cases in which a decision was made to recognize the bankruptcy of Ukrainian companies (x)

Year	Y	x	r	D	F	F _t	ε̄	Regression equation
2013	37.0	-24.88	-0.3795	0.1441	1.005	2.447	-34,662	Y = -0.01985 - 0.80001x
2014	36.6	-27.46						
2015	33.7	-37.6						
2016	26.3	-14.17						
2017	26.6	-23.013						
2018	27.2	-10.32						
2019	25.7	-35.99						
2020	26	-18.365						

Table 4. Relationship between the unprofitability of Ukrainian companies (Y) and the general liquidity ratio for all functioning companies of Ukraine (x)

Year	Y	x	r	D	F	F _t	ε̄	Regression equation
2013	36.6	1.141188	0.92516	0.8559	5.971	2.447	7.43650	Y = 0.00428 + 0.034571x
2014	33.7	1.038303						
2015	26.3	0.998469						
2016	26.6	0.987365						
2017	27.2	0.979423						
2018	25.7	0.980731						
2019	26	0.981624						
2020	28.6	0.99133						

acterizes the constructed linear regression equation to real economic processes and phenomena. Therefore, it is concluded that an increase in the level of the general liquidity ratio by 1% will lead to an increase in the level of the unprofitability of Ukrainian companies by 0.0346%. It is of great interest to determine the relevant impact considering the size of companies (large, medium, small, and micro), shown in Table 5.

There is a connection between the level of the unprofitability of Ukrainian companies and the general liquidity ratio for all functioning companies

in Ukraine. However, considering such a feature as their size, everything is not so clear-cut here. The most substantial connection is recorded for medium-sized companies. The correlation coefficient is 0.9274, the determination coefficient is 0.8601, and the constructed correlation-regression equation is characterized by statistical reliability and adequacy. The most negligible influence between the studied performance characteristic (Y) and the factor (x) is recorded for large companies. Their coefficients of correlation and determination are 0.31903 and 0.1017, respectively. Micro companies obtained, respectively, 0.53264 and 0.2837.

Table 5. Relationship between the unprofitability of Ukrainian companies (Y) and the general liquidity ratio for all functioning companies of Ukraine (x) according to their size

Year	Y	x	r	D	F	F _t	ε̄	Regression equation
Large companies								
2013	32.3	1.127	0.31903	0.1017	0.825	2.447	22.60	Y = 0.02505 + 0.028384x
2014	50.6	1.056						
2015	43.8	1.023						
2016	34.2	0.994						
2017	27.2	0.999						
2018	23.3	1.022						
2019	22.0	0.984						
2020	30.3	1.039						

Table 5 (cont.). Relationship between the unprofitability of Ukrainian companies (Y) and the general liquidity ratio for all functioning companies of Ukraine (x) according to their size

Medium companies								
2013	36.3	1.131						
2014	38.6	1.082						
2015	29.4	1.016						
2016	24.5	1.01						
2017	23.9	0.983	0.9274	0.8601	6.076	2.447	14.46	$Y = 0.017594 + 0.034778x$
2018	22.3	0.936						
2019	22.4	0.963						
2020	23.5	0.975						
Small companies								
2013	35.0	1.167						
2014	34.3	0.97						
2015	26.5	0.955						
2016	27.2	0.965						
2017	27.7	0.957	0.62415	0.3896	1.957	2.447	6.73339	$Y = 0.003109 + 0.033926x$
2018	26.3	0.996						
2019	26.7	1						
2020	28.9	0.971						
Micro companies								
2013	34.8	1.162						
2014	33.9	0.913						
2015	26.7	0.928						
2016	28.1	0.934						
2017	28.6	0.935	0.53264	0.2837	1.542	2.447	6.7157	$Y = 0.001859 + 0.032439x$
2018	27.2	0.977						
2019	27.9	0.972						
2020	29.9	0.926						

At the same time, the constructed correlation-regression equations based on the size of companies (large, small, micro) are statistically unreliable since the calculated Fisher coefficient does not correspond to the normative (tabular) value.

4. DISCUSSION

Liquidity reflects the ability of a company to fulfill its obligations on time and in full with its matured assets. Therefore, liquidity is closely related to the effectiveness of company activities. This study is based on assessing the relationship between companies' general liquidity ratio and unprofitability. The theory substantiates the dual statement that, on the one hand, liquidity does not affect financial difficulties (Indarti & Sapari, 2020; Nurhayati, 2013; Dianova & Nahumury, 2019; Amanda & Tasman, 2019; Azalia & Rahayu, 2019). However, on the other hand, it does affect (Enqvist et al., 2014; Bibi & Amjad, 2017; Chung et al., 2009; Thumma & Gannavaram, 2020; Reschiwati et al., 2020). Then, by singling out such a component of

the company's financial difficulties as "unprofitability," a close, reliable, and direct connection was established between the general liquidity ratio and company unprofitability. The mechanism of this influence is that in the case of an irrational capital structure, in particular, the non-use of a significant part of fixed assets; investing significant funds in stocks that are not used for an extended period; the presence of significant funds on the current account that are not used, the company can potentially incur losses. Furthermore, since the cost of production increases (for example, the accrual of depreciation deductions on equipment that is not used, or on buildings and structures that are also not used, or are partially used in the production process), and income remains at the previous level, or due to the influence of endogenous and exogenous factors (Bilenko et al., 2022; Kozlovskiy & Fonitska, 2013; Petrunenko et al., 2022; Shevchuk et al., 2023) can significantly decrease. This will inevitably lead to a drop in profits, and there is even a very high probability of incurring losses and, as a result, liquidation of companies.

The paper proves that liquidity affects financial difficulties, in particular, the unprofitability of companies. That is, with the growth of the liquidity ratio, companies' unprofitability level increases. However, it is worth emphasizing such a feature of companies as their size. It was found that a closer, reliable, and adequate statistical connection was recorded for medium-sized companies; the rest – large, small, and micro – have a less close and reliable connection. At

the same time, some issues remain debatable, namely individual indicators of the impact on the unprofitability of companies. They assess liquidity and take into account such components of current assets as stocks, cash, and funds in bank accounts, receivables and expenses of future periods and, accordingly, components of current liabilities, especially short-term and long-term liabilities (Kozlovskiy et al., 2019; Trofymenko et al., 2022).

CONCLUSION

The influence of the level of the general liquidity ratio of functioning Ukrainian companies on the level of their unprofitability is determined, which is considered an instrument in the management decision-making system to prevent the bankruptcy of Ukrainian companies. The conducted empirical analysis proved a close, reliable relationship between the general liquidity ratio for all operating companies in Ukraine and their profitability ($r = 0.92516$; $D = 0.8559$; F -criterion $> F_p$). Other parameters characterize the adequacy and reality of economic processes of the constructed regression equation, making it possible to predict the value of the resultant variable. An increase in the level of the general liquidity ratio by 1% will lead to an increase in the level of the unprofitability of Ukrainian companies by 0.0346%. In addition, it was determined that there is no connection between the profitability of Ukrainian companies and the level of decrease in the number of court cases in which a decision was made to recognize the bankruptcy of Ukrainian companies ($r = -0.3795$). Evaluating the relationship between the general liquidity ratio for all Ukrainian operating companies considering their size and unprofitability, it was found that the most significant and statistically reliable relationship was recorded for medium-sized companies ($r = 0.9274$; $D = 0.8601$; F -criterion $> F_p$). However, there is a connection for large, small, and micro companies, but it is less close and statistically reliable.

The relevance of the study is also related to the fact that the available and unused working capital leads to a decrease in the company's income. In the conditions of the spread of the COVID-19 pandemic, war, inflation, economic instability, high competition, and rising costs, it automatically leads to a lack of income or incurred losses and, as a result, a decrease in solvency, liquidity, an increase in the probability of bankruptcy and liquidation of companies.

AUTHOR CONTRIBUTIONS

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Formal analysis: Rodion Poliakov, Ivan Zayukov.

Funding acquisition: Rodion Poliakov.

Investigation: Rodion Poliakov.

Methodology: Ivan Zayukov.

Project administration: Ivan Zayukov.

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