
Financial Liquidity Management During Crisis

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Abstract:

Purpose: The aim of the article is to verify a hypothesis stating that financial security of companies has been significantly violated in the scope of economic crisis caused by COVID-19 pandemics. It has been assumed that traditional indicators of financial liquidity have declined and establishing the scale of the phenomenon constitutes a scientific problem.

Design/Methodology/Approach: The research has been conducted as exemplified by a given sector: consumer goods and retail trade on the basis of data adapted from EMIS database. The research has regarded years 2018-2021. Statistical characteristics of two features have been used: current ratio indicator and quick ratio indicator, determining the location, spread, asymmetry and flattening characteristics. The analysis constructed in such a multidimension way was to enable a proper verification of the hypothesis stated.

Findings: The results of the research has not verified the research hypothesis positively: the companies of a given sector had not compounded, and even improved their financial security measured with the use of traditional liquidity indicators.

Practical implications: The conducted research regarding the liquidity management in companies in a extraordinary time od crisis emphasizes the multifaceted nature and complexity of issues connected with financial security; simultaneously discussing the statement that the entrepreneurs' concern over the extending period of uncertainty, lead them to a certain mobilization to secure from lack of liquidity and forced more awareness in the topic of liquidity.

Originality/value: In the process of data analysis certain characteristic features were observed: the average indicators in the sector are much higher than middle indicators which indicates the need to have a closer look at average data. In a researched sector most of the enterprises does not achieve the results suggested for liquidity indicators.

Keywords: Financial management, financial liquidity management, financial security.

JEL codes: G10, G32.

Paper type: A research article.

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1. Introduction

In year 2020, in the face of unprecedented challenges, the world economy has fallen into a great recession. The shock connected with COVID-19 was of a more exogenous character than previous crisis from 2008 and 2011-2012. While in previous crisis episodes the specific problems of a financial sector played the crucial role, the 2020 recession had its foundation outside the economy.

The spread of COVID-19 had a huge impact on economic activity, starting in China then in the whole world. International trade collapsed, global chains of values functioning was significantly inhibited, and global markets uncertainty rapidly increased. The economy of the Euro Zone was also strongly affected as a consequence of pandemics. Its influence was visible e.g., in the consumption rate, which declined significantly after the introduction of far-reaching restrictions in the first half of the year, and as a result of higher risk aversion. The economic activity, especially in the services sector, also considerably declined because of a low demand and imposed limitations (European Central Bank, 2020).

Undoubtedly, the pandemics upset the financial security of enterprises. The imposed limitations, closed shops, repeated stops of business activity caused by diseases in the workplace, confined normal companies' functioning. The question is: to what extent? And were the consequences of a permanent character? The questions were and still are asked by politicians, scientists and entrepreneurs.

The aim of the article is to try to answer the question whether the short term financial security of enterprises in a given sector was significantly violated and, alternatively, what was the scale of the phenomenon. The problem is crucial from the perspective of financial liquidity management during crisis.

The level of financial security is not a new idea. It is not „assigned“ for difficult crisis time. Sustaining financial security is one of the key tasks modern economic entities are facing. Uncertainty is an imminent feature of administering, which brings the necessity for constant management, monitoring and keeping an appropriate level of financial security. It is interpreted variously in literature.

Financial security can be understood as securing the financial interests of entities on each level of financial relations (Zahorodniy and Voznyuk, 2007). Delasa *et al.* (2015) broaden the approach and indicate that it can be characterised with a certain level of time and space harmonisation of copartnership and its contractors interests, i.a. clients, suppliers, competition, investors, government and society (Delasa *et al.*, 2015), taking into account that it is a point of interest of a number of entities and institutions being in close to the enterprise, especially the creditors whose point of interest concentrates on evaluating the ability of the enterprise to service the debt and its on-time payments.

The most popular ways to determine the level of company's financial security include the use of liquidity indicators. It is treated as the ability of an enterprise to manage its financial commitments. It forces companies to hold liquid assets (Opler, Pinkowitz, Stulz, and Williamson, 1999).

Liquid assets can be easily changed for cash without a significant loss in value (Helfert, 1997). It can be also added, that fully liquid assets are not bond with a discount of losing liquidity (Bodie and Kane, 2009). The level of the enterprise liquidity depends on the amount of cash at disposal, the amount of other assets, which can be easily changed into cash, number of commitments that would require payments in the near future and the ability of the company to gain additional cash by shares emission or taking a loan (Chambers and Lacey, 2011). The costs connected with commitment payments are of importance and should be possibly the lowest (Maness and Zietlow, 2005).

Therefore the level of financial liquidity is defined by the ease in changing a specific asset into money at the lowest possible transaction costs which are related to the exchange, where the higher the ability, the bigger the potential financial liquidity of the entity. Financial liquidity is usually described with two main indicators, which are: current liquidity indicator and accelerated liquidity indicator. Sometimes they are complemented with cash liquidity indicator.

They are often described as static indicators, as they are based on the data taken from the balance sheet. They determine the liquidity for a particular balance sheet date, so a strictly determined time when the entity prepares a financial report. The construction of the indicators guarantees the independence of the measurement result from the size of the enterprise, what allows for comparison of the liquidity level changes in time and space. Traditional liquidity indicators depict the ability of the enterprise to pay current commitments and the ability is determined by the level of current asset liquidity of the company.

The current liquidity indicator means a relation of current assets to current liabilities of the enterprise. Literature provides different norms which are regarded as safe, most often it is believed that the indicator should equal 1,5- 2,0. The construction of the fast payment indicator excludes the elements, which in theory are the least liquid and it is difficult to change them to cash (without extra costs) in a short period of time, and they constitute the stock. It is accepted that the indicator should oscillate between 1,0 – 1,5.

The liquidity indicators play an important role in evaluating the financial condition of the enterprise, despite the fact that they do not directly determine its effectiveness. However, it is worth remembering that violating the financial security can lead to payment backlogs, and as a consequence the business failure. The enterprise, in a long period of time, can generate profits and realize its statutory actions and aims provided that its functioning is not endangered.

And although maintaining the proper level of liquidity in a given period of time requires costs, which could impact the financial results, there is a number of researches confirming a positive interrelation between liquidity and profitability and entities value. Such considerations were drawn by i.a., E. Hirigoyen (Hirigoyen, 1985), claiming that in a medium and long period of time the relation between liquidity and profitability can be positive in the sense, that low liquidity would result in lower profitability due to the higher demand for loans and lower profitability would not generate enough financial flows, creating a vicious circle.

In his article Hirigoyen develops the idea in a theoretical way, however without an empirical practice in companies (Pimentel *et al.*, 2005). Such analysis have been performed by i.e., R. Schwambach Vieira. His research confirmed, that average profitability of copartnerships with high liquidity was much higher than those with low liquidity. The percentage of companies which generated loss during the crisis was much higher among companies with low liquidity.

Additionally, the author indicates, that relations between liquidity and profitability are positive in relatively calm times, however during crisis the relation was of a much greater importance (Schwambach Vieira, 2010). It can be therefore assumed that maintaining financial liquidity constitutes an indispensable condition to generate profits, building the value of the company, sustaining and increasing its market position, which is confirmed by a number of research articles (Smith, 1980; Jose *et al.*, 1996; Baños-Caballero *et al.*, 2012).

The popular, traditional liquidity indicators are not ideal. What is more: are far from perfect and are defined by a number of limitations. Most of all, they are based on balance sheet data. Stock and liabilities, which are a basis of the enterprise current assets can lead to a wrong assumption that they are easily negotiated (changed into money), where at the same time they can be difficult to transfer. If we cannot transfer them easily – they will not allow for continuation and reconstruction of the operational activities in a short period of time (Basno and Dardac, 2004).

In particular it regards the enterprises of a seasonal character (Gibson, 1991). In such a situation the enterprise, formally maintaining the financial liquidity, loses the financial security. Regardless of controversies connected with determining the financial security with the use of the above mentioned liquidity indicators, the necessity of analyzing the liquidity problem and conscious, deliberate financial liquidity management in enterprises, is being pointed at, especially during crisis, which is definitely defined by a situation of companies in 2020.

Special interest and care for a proper liquidity level control are of a bigger importance in difficult times. Scientific research indicate that enterprises with a bigger liquidity margin were able to achieve better results during crisis, what undoubtedly emphasizes the role of active management of this financial element, showing the advantages in an unstable world (Eljelly, 2004).

2. Materials and Methods

The research encompasses the companies with main activity belonging to sector consumer goods and retail trade. The group was limited to enterprises not being bankrupt, which gained income of more than 0,5 million euro in a financial year, and balance sheet value of the assets also exceeded 0,5 million euro. International EMIS database (Emerging Markets Information Service) was used to collect the data.

The researched period of time ranges 2018-2021, where the data collected in the last year might be incomplete (the database is updated regularly, however the number of enterprises fulfilling the assumed conditions half as low as the previous years). In 2018 2198 companies were qualified for research, in 2019 the number was 2221, in 2020 – 2041 and in 2021 only 1063.

Main research hypothesis was stated: basic liquidity indicators were significantly lower in 2020 than in previous years. Media news regarding problems of companies, connected with their solvency in respect to limitations of their free functioning, were accepted as trustworthy. The main research problem was to set a scale of the phenomenon. The research made use of statistics of two features: current liquidity indicator and accelerated liquidity indicator with respect to:

1. Location characteristics (arithmetic mean, median).
2. Spread characteristics (standard deviation, coefficient of variance, range).
3. Asymmetry characteristics (skewness).
4. Flattening characteristics (kurtosis).

2.1 Location Characteristics

Arithmetic mean is a sum of all the results of a researched characteristics divided by their amount. It is a number informing about the value of the characteristics in elements where all the statistical data are equal and their sum would be the same (the division of the volume into n pieces). Arithmetic mean is independent of the layout, it is a coherent estimator of the expected value. It is affected by skewness and outliers.

$$\bar{x}_n = \frac{x_1 + x_2 + \dots + x_n}{n} = \frac{\sum_{i=1}^n x_i}{n}$$

Arithmetic mean
(central tendency measure)

where:
 \bar{x}_n —arithmetic mean from the sample,
 x_i —subsequent values of a given random variable in the sample,
 n —sample size.

Median divides the set of statistical data into two equinumerous subsets: one constitutes of data smaller or equal to the median, the other of data higher or equal to the median. In other words it is a characteristic in organized rows of the same

number of observations higher and lower than the value. It is a measure much less affected by outliers than the mean.

Median (central tendency measure)	If n is an even number, the median (m) is:
	$m = \frac{x_{\frac{n}{2}} + x_{\frac{n}{2}+1}}{2}$
	when n is an odd number, it m :
	$m = \frac{x_{\frac{n}{2}+1}}{2}$

2.2 Spread Characteristics

Standard deviation is calculated as a root of a variance. It is an arithmetic mean of the deviation squares of particular values of the variable from the arithmetic mean of the whole set of data. It is a measure of average deviation of the measurements results from the average: the higher the deviation the more scattered the results. Standard deviation is affected by outliers. Moreover it gets distorted in case of skewed layouts.

Variance and standard deviation (dispersion measures)	Unbiased variance estimator (s^2):
	$s^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x}_n)^2$
	Standard deviation of the sample (s):
	$s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x}_n)^2}{n-1}}$

Coefficient of Variance means a quotient of standard deviation and arithmetic mean. It expresses the percentage of standard deviation towards arithmetic mean. Range is a difference between the highest and the lowest statistical data. Range expresses the length of the shortest interval, to which all statistical data belong. The measure is highly affected by outliers. It is not defined algebraically.

Range (dispersion measure)	$Range(x) = \max(x) - \min(x)$
	where:
	$Range(x)$ —range,
	$\max(x)$ —maximum value of a given random variable in the sample,
	$\min(x)$ —minimum value of a given random variable in the sample.

3. Results

The table shows chosen statistical features of current liquidity indicators for a researched group of enterprises in sector of: consumer goods and retail trade (EMIS database), and the dynamics of the changes in years 2018-2021.

Table 1. Characteristics of current liquidity indicator and its dynamics.

Current liquidity ratio				
	2018	2019	2020	2021
Mean	2,32	2,06	2,34	2,33
Standard error	0,20	0,07	0,21	0,12
Median	1,30	1,28	1,38	1,50
Standard deviation	9,30	3,43	9,43	4,00
Sample variance	86,42	11,79	88,89	15,96
Kurtosis	1189,46	455,99	1649,60	251,36
Skewness	31,71	16,72	38,86	13,27
Range	372,47	109,61	405,87	90,77
Confidence level (95,0%)	0,39	0,14	0,41	0,24
Dynamics				
	2018	2019	2020	2021
Mean	-	89,00	113,29	99,59
Standard error	-	36,74	286,45	58,72
Median	-	98,46	107,81	108,70
Standard deviation	-	36,93	274,60	42,38
Sample variance	-	13,64	754,05	17,96
Kurtosis	-	38,34	361,76	15,24
Skewness	-	52,73	232,37	34,15
Range	-	29,43	370,29	22,36
Confidence level (95,0%)	-	36,74	286,47	58,75

Source: Self-study on the basis of EMIS database.

The presented data allows for a in-depth analysis of the obtained results for a current liquidity indicator in a analyzed sector. Average results for a sector do not arouse serious suspicion: the indicators remain within recommended values (it is assumed that optimal value ranges between 1,5-2,0) in each year of the study, and are even slightly higher.

It is worth paying attention though, on a significant difference between the average values and medians, which are middle values. Half of the population under research achieve the indicator values at a meaningfully lower level (1,3-1,5). It suggests an asymmetric population layout. It is confirmed by high values of variance and kurtosis as well as skewness, especially in years 2018 and 2020.

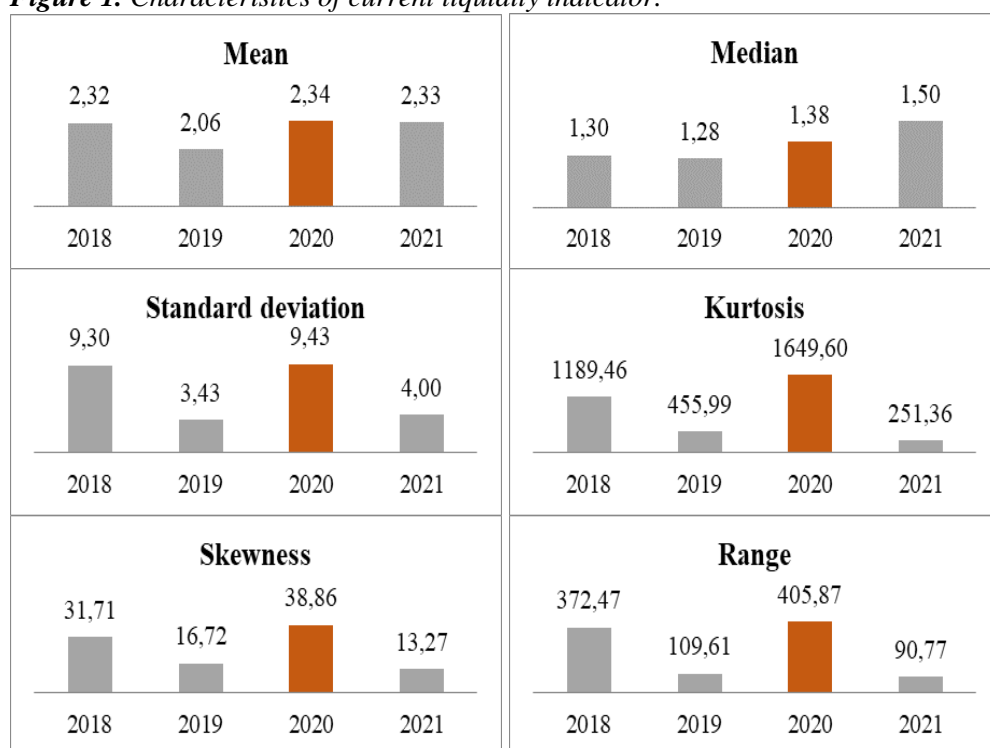
The spread therefore, in the ratio of the average is very high, and the layout is right-handed (in case of liquidity indicator the layout is naturally right-handed, as it is limited to zero value on the left side and the values on the right side are practically limitless. However, it is about the scale of the phenomenon).

Evaluating the correctness of the short term security policy in enterprises, and so forth: in a sector, median should be taken into consideration. In years 2018-2021 the

percentage of the entities, which achieved a current liquidity indicator at the level lower than 1,5, was between 54,5% and 59,5%. Interestingly, year 2020 – so the year that was supposed to be the most difficult for enterprises, was not so: the highest average value in sector was noted, and additionally all other measures show a significant increase comparing to the previous year. It definitely does not prove the research hypothesis.

The figures present the most important statistical data for current liquidity indicators, distinguishing year 2020, which unexpectedly proved to be better than the previous ones (year 2021 seems to be even more positive, however because of limited data, the authors do not want to predestine). Additionally it is worth remembering, that with high indicators of skewness, the average does not reflect the central tendency.

Figure 1. Characteristics of current liquidity indicator.



Source: Self-study on the basis of EMIS database.

Having done the analysis of the current liquidity indicator, it can be stated with a high degree of certainty, that the obtained results for accelerated liquidity indicator would show similar relations. It depends, however, on the structure (and its possible changes) of liquid assets in companies, which could be affected by changes in respect to pandemic crisis specifics. It mostly regards the condition of stock. The desirable value of the accelerated liquidity indicator is accepted at 1,0 to 1,5 level.

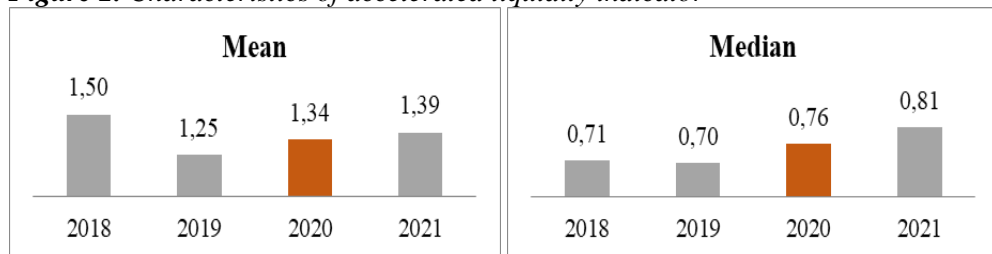
Moreover, enterprises present positive results, when consider only the arithmetic mean. Again the median leaves a lot to be desired (is significantly lower). The indicator appeared to be less variable in time in the ratio to current liquidity indicator. Simultaneously, still in 2020 the situation of enterprises (average) did not get worse, contrary: it improved, and the tendency repeated itself the next year.

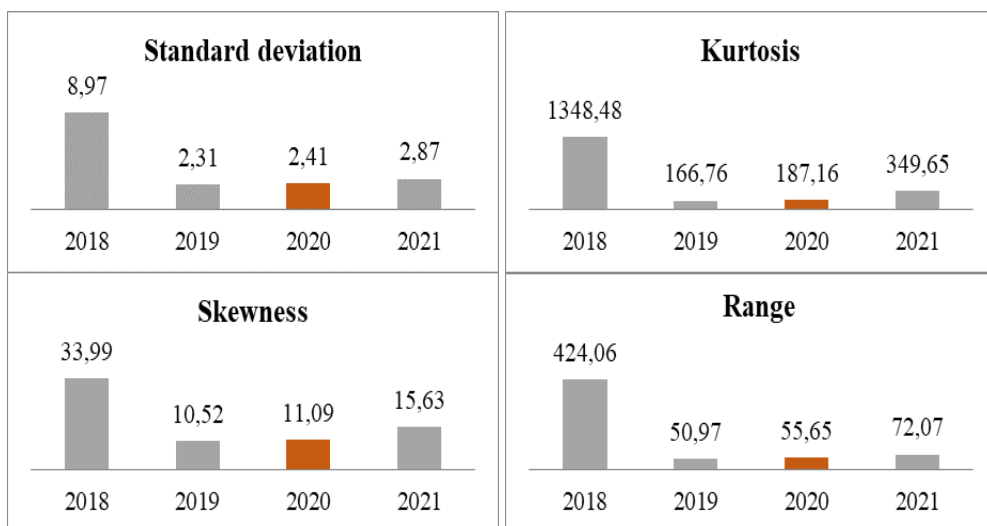
Table 2. Characteristics of accelerated liquidity indicator and their dynamics.

Quick ratio				
	2018	2019	2020	2021
Mean	1,50	1,25	1,34	1,39
Standard error	0,19	0,05	0,05	0,09
Median	0,71	0,70	0,76	0,81
Standard deviation	8,97	2,31	2,41	2,87
Samplevariance	80,46	5,35	5,83	8,24
Kurtosis	1348,48	166,76	187,16	349,65
Skewness	33,99	10,52	11,09	15,63
Range	424,06	50,97	55,65	72,07
Confidencelevel (95,0%)	0,38	0,10	0,10	0,17
Dynamics				
	2018	2019	2020	2021
Mean	-	83,52	107,60	103,11
Standard error	-	25,64	108,95	164,79
Median	-	98,59	108,57	106,58
Standard deviation	-	25,78	104,44	118,87
Samplevariance	-	6,64	109,08	141,30
Kurtosis	-	12,37	112,24	186,82
Skewness	-	30,95	105,38	140,92
Range	-	12,02	109,18	129,51
Confidencelevel (95,0%)	-	25,64	108,96	164,88

Source: Self-study on the basis of EMIS database.

Figure 2. Characteristics of accelerated liquidity indicator





Source: Self-study on the basis of EMIS database.

The analysis of liquidity indicators achieved by enterprises of the sector: consumer goods and retail trade (EMIS database) in years 2018-2021 did not prove the stated hypothesis, which assumed the deterioration of the enterprises situation, connected with short term financial security – solvency. The results do not comply with other analysis conveyed on an ongoing basis in the first stage of COVID-19 pandemics in 2020.

It is worth quoting the research conducted by The National Bank of Poland, which pointed out, that the most important channels of epidemic shock transmission to enterprises were: the increase of uncertainty of running a business, lack of demand caused by economic lockdown and consumer uncertainty and unwillingness to spend money as well as increase in the unit labor costs. In the face of pandemics companies often withheld the public-law liabilities liquidation in the wait for public help and about 10% withheld regulating the trade and credit liabilities.

Most of the companies noted delays in payments from clients. On the other hand Central Statistical Office in the economic situation research showed that according to sector, 70-80% of the companies had encountered at least small payment backlog, and another 20 to 50% regarded the backlogs serious and threatening.

Despite the fact that such research monitored more likely the declarations and moods of entrepreneurs instead of dealing with hard data, at least in part should be visible in balance and financial results of enterprises. If we assume, that liquidity is a measure of risk undertaken by the enterprise – the results of the research do not indicate the lack of financial security in a given group of companies, and implementation of different kinds of anti-crisis shields by the government, did not have a strong impact

on financial situation of enterprises. Such situation should give reason for discussion even more than with the hypothesis being confirmed.

4. Discussion

The discussion may be started with the choice of the financial liquidity indicators and finished with the evaluation of financial security. The question arises, if they should be based on accounting or cash-based data. In recent years, especially during financial crisis and accompanied related payment backlogs, it is possible to notice the wider use of cash-based method. It seems reasonable to complement the classical measures of liquidity with the measures based on generated cash, which gives more possibilities to evaluate financial security (Sharma, 2001).

For many years a number of researchers doubts the adequacy of traditional liquidity indicators for evaluating financial security, promoting an approach based on cash conversion cycle. Such a dynamic measure of liquidity was proposed by Hager (1976), and his research was confirmed by other scientists (Largay-Stickney, 1980; Kamath, 1989; Aziz and Lawson, 1990), who suggest to complement the traditional method with cash conversion cycle instead of replacing them. It is necessary to emphasize that there is a positive relation between static methods and dynamic methods (Richards, Laughlin, 1980).

In the introduction the construction of liquidity indicators has been pointed to. The “categorizing” of a given asset to the liquid assets category, often is not enough: stocks can appear to be difficult to transfer, and receivables difficult to collect. The mere state of those positions in case of seasonal companies, may give a blurred assumption about the enterprise.

Finally, there are enterprises showing high liquidity indicators, however it is not aimed at securing against financial risk, but a result of a improper use of the current assets, and sometimes even – weak market position. On the other hand, some enterprises, which achieve critically low financial liquidity indicators, do not always face real trouble with current liabilities (because e.g., they have constant access to external financing). Yet another problem worth being thought over is the choice of the research sample.

There are vast possibilities for other studies: maybe a repeated comparative analysis of other sectors would be of a great value? Maybe it would enable to draw conclusions explaining the situation in a chosen sector. Maybe it would be reasonable to complete a more detailed and deepened analysis of a given sector in search for the sources of huge diversity of the results in a researched population.

There are studies regarding the short term liquidity maintenance showing the differences in enterprises reaction in respect to their i.e. size: small businesses in the scope of crisis and awareness of the problems with liability payments, keep the

liquidity indicators at high levels and act much more likely with caution. Such research was conducted by i.a. Baum et al. (Baum et al., 2006). The authors explain such behavior with the level of asymmetry of information and potential problems with acquiring money.

5. Conclusions

The conducted research did not confirm the stated hypothesis of weakening the financial liquidity of enterprises connected with 2020 pandemics. Enterprises even showed improvement of the liquidity indicators compared with year 2019, where in general the researched companies in most instances were not concerned with a proper financial security.

The research assumed that the loss (or deterioration) of liquidity was one of the first unprecedented results of the economic crisis caused by COVID-19. In the analyzed sector (consumer goods and retail trade) they appeared to be unjustified.

There is still one question to be answered, what would be the long term results of the crisis caused by COVID-19 pandemics. There is a number of such analysis, which are rather of a divagation character, and they most often point to negative consequences (Jorda *et al.*, 2020; Kozłowski *et al.*, 2020). Possibly, in the context of financial security, the situation to be faced by entrepreneurs, paradoxically is to bring positive effects in the form of enhanced care about liquidity, conscious management in the area, constant monitoring of financial flows and reevaluation of the approach to risk. Definitely, the pandemics has emphasized the need, which can have a real impact on the behaviors of entrepreneurs.

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