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Financial Liquidity Management in Polish Enterprises In The Conditions of Non-Stable Macro-Environment*

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Abstract

Financial management in modern enterprises becomes particularly important in crisis conditions. Many years of experience of scientists and researchers indicate that attention to the proper relations between the capital structure and the asset structure is the key to the success of an enterprise and a condition for its survival in the conditions of an unstable macro-environment. The COVID-19 pandemic and the war in Ukraine have left a mark on the global economy. The effects of these events also affected the Polish economy and Polish entrepreneurs.
This study attempts to identify macroeconomic factors influencing the capital structure of enterprises. Particular attention was focused on the relationship between the debt structure and the structure of assets responsible for maintaining financial liquidity. Researchers have often proven that deterioration of financial liquidity is the main reason for the bankruptcy of enterprises, despite their profitability.
In the light of the research carried out, based on data covering the non-financial enterprise sector in Poland, the main factors shaping the financial liquidity of Polish enterprises in the conditions of an unstable macro-environment were selected. Debt management and inflation had the greatest impact on the degree of liquidity ratios. Profitability and the economic situation did not have a significant impact on the degree of liquidity in crisis conditions. The Polish enterprise sector did not significantly suffer the effects of the COVID-19 pandemic, however, the negative effects of the war in Ukraine are noticeable. This is not a good prognosis for the future if the armed conflict in Ukraine lasts longer.
The time scope of the study spans over the period 2019-2023, and the discussed subject matter covers the sector of Polish non-financial enterprises. The following research methods were used in the study: critical analysis of the source literature, statistical analysis, financial analysis and Pearson linear correlation analysis.

Keywords: macro-environment of the enterprises, capital structure management, liquidity management,

Introduction

Many years of experience acquired by analysts and researchers regarding business functioning in the changing macroeconomic conditions confirm that liquidity is crucial in building a sustainable foundation for business operations (Altman 1968). Liquidity management, in turn, is widely regarded as an important management tool used by organizations, because it affects, i.a., financial performance and can be a source of competitive advantage (Robinson et al., 2015). Liquidity, which includes short-term asset-capital relations, illustrates the ability to meet current liabilities in connection with current assets (Sinha, 2012). Reduced ability to repay these obligations can

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become a signal of emerging difficulties in short-term asset management (Amengor, 2010). On the other hand, the perceived improvement in liquidity can indicate positive changes taking place in an organization (Gibson, 2009).

One of the most widespread views on financial statement analysis is that liquidity ratios are useful in the process of early warning and prediction of financial problems. The issue of liquidity and its crucial importance for the process of building a sustainable financial foundation was addressed in the landmark articles by, e.g., Beaver (1966), Altman (1968), Shumway (2001). The cited authors indicated a significant correlation between various aspects of liquidity presented by means of liquidity ratios as well as future financial problems and bankruptcies. Business liquidity depends on the ability to manage the resources at hand. In particular, the efficiency of equity and debt capital, made real by the liquidity held, is a measure for assessing financial management in the long and short term (Krajewski 2013). Liquidity management becomes particularly important during periods of economic downturn. Maintaining liquidity in such a reality becomes the primary goal of an enterprise, even more important than its profit.

Determining an appropriate, optimal and universal degree of liquidity is difficult to indicate clearly, despite the common tools available in the source literature – liquidity ratios that define asset-capital correlations. The commonly known measures of liquidity in the form of current ratio (CR), quick ratio (QR), or other liquidity ratios relating to the realization of debt payments from cash and near-cash current assets (Kirkham 2012) provide limited knowledge about the actual state of liquidity. The theoretical values assigned to individual liquidity indicators may not be relevant to changes in the micro-environment of an enterprise. It refers, in particular, to maintaining inventory levels, short-term receivables and cash, as well as using credits and loans in the context of dynamic changes in interest rates.

Regular monitoring of liquidity through analyzing financial ratios, such as the current ratio, quick ratio, or accounts receivable turnover ratio allow early detection of potential problems and taking appropriate corrective measures (Jones, S., Johnstone, D. & Wilson, R. 2017).

The inspiration to focus in this study on the subject matter of liquidity management in an unstable macro-environment was the noticeable deficit of scientific analyses on the problem of economic impact of the COVID-19 pandemic and the war in Ukraine on maintaining liquidity in Polish business sector. Thus, this study attempts to determine changes in the liquidity degree of Polish enterprises in the context of dynamic changes occurring in the macroeconomic situation caused by the COVID-19 pandemic and the war in Ukraine. The study attempts to provide answers to the questions: which macroeconomic factors may affect the decisions taken by entrepreneurs in capital structure management, in particular, debt formation, and to what extent the global health crisis caused by the COVID-19 pandemic affected the liquidity of Polish business sector. An attempt was also made to find an answer to the following questions: to what extent the war in Ukraine affected the financial situation regarding this aspect, and what type of reasons had a direct impact on financial management in terms of liquidity.

The time scope of the study spans over the period 2019-2023, and the discussed subject matter covers the sector of Polish non-financial enterprises. The following research methods were used in the study: critical analysis of the source literature, statistical analysis, financial analysis and Pearson linear correlation analysis.

Capital structure and liquidity management – a literature overview

Liquidity management is one of the key elements in the decision-making process related to financial management of enterprises and their capital structure formation. Theoretical models for constructing the optimal capital structure and the factors affecting decisions in this regard have been analyzed for a long time, e.g., by Modigliani and Miller (1958). In the following years, other theories appeared, among others, the agency theory developed by M.C. Jensen and W.H. Meckling (1976) and the signaling theory indicating that the shape of the capital structure provides information to the business environment about the financial situation of an enterprise and its development opportunities (Ross 1977). In subsequent years, further theories of capital structure construction appeared, e.g.: pecking order (sequence) theory which determines how to start and develop financing. This theory was first suggested in 1961 by Donaldson (Donaldson 1961) and later developed and modified in 1984 by Myers (Myers 1984). An in-depth analysis of the theory of capital structure was carried out in 1991 by Harris and Raviv (1991) and in 2007 by Frank and Goyal (2007). As part of this analysis, the authors highlighted internal factors that can affect decisions on the sources of financing (Jaworski , Czerwonka 2019).

Many researchers are challenging both Modigliani and Miller's theory as well as Donaldson's theory. This gives rise to modern trends which incorporate features of both theories expanded with new observations. However, the authors of modern concepts of corporate financing agree that managers should make financial decisions facilitating an optimal structure of enterprise financing (Nawrot 2007). The construction of such a structure should also take into account maintaining financial liquidity, as the shape of the capital structure and the degree of liquidity are significantly correlated. Liquidity is a consequence of debt decisions and other factors, in turn, the degree and structure of debt are, to some extent, dependent on liquidity and the ability to repay debt.

Liquidity management is carried out under the conditions of factor variability, both typically endogenous and also exogenous ones. While the source literature describes internal factors determining the shape of business capital structure and liquidity management models widely and fairly well, external factors of macroeconomic nature are not so popular. The relevance of macroeconomic factors in the context of financial situation experienced by enterprises, including liquidity, is systematically highlighted in times of financial crises and their consequences (Grammatikos, Vermeulen 2012) and (Cheong, Hoang 2021) and also (Filardo, George et al. 2010). The experience of the 2007-2010 financial crisis and its effects on the corporate sector could be used today for the purposes of managerial decisions in the face of the crisis caused by the COVID-19 pandemic and the war in Ukraine. Indeed, during the financial crisis triggered in the United States, researchers were able to gain a rare opportunity to study the response of companies and institutions to the deep financial and economic crisis (Arnold, 2009) and (Van der Stede, 2011). However, it is often pointed out that this opportunity has not been fully utilized by the scientific circles, and not enough conclusions and solutions have been proposed on how to prevent crises and their consequences for enterprises in the future (Pavlatos, Kostakis 2018).

One of the most important conclusions following the analysis of the causes and effects of the 2007-2010 financial crisis was, i.a., the observation that every enterprise must maintain financial flexibility, as this helps prepare for potential business risks and facilitates fast response to rapid changes in the macro-environment. Maintaining proper balance between current assets and current liabilities in such a situation remains crucial in the face of unexpected disruptions to economic processes. Poor liquidity management can also prevent companies from taking advantage of new business opportunities that arise during a crisis, which can result in the lost potential opportunity to gain competitive advantage (Campello et al. 2011).

Liquidity plays a key role in the development of a company. Liquidity management has therefore become a fundamental aspect of evaluating business performance. Liquidity should be neither too high nor too low. Excessive liquidity indicates idle funds that do not generate any profits while insufficient liquidity adversely affects business credibility, disrupts and significantly limits its earning capacity (Das 2022). A commonly cited definition of liquidity in the source literature highlights business ability to easily convert its assets into cash and quickly repay debts and short-term liabilities (Ebben, Johnson, 2011). Researchers agree that among the measurable macroeconomic factors, the shape of capital structure, debt and, as a result, liquidity are influenced by such factors as: GDP, interest rates, inflation (Jaworski, Czerwonka 2019). The COVID-19 pandemic and the war in Ukraine brought about significant changes in the global economy. Some industries and even entire branches of the economy suffered from the effects of these phenomena. Thus, it definitely affected the basic financial indicators of enterprises. The Polish economy was one of the few in the world to suffer from both the COVID-19 pandemic and the war in Ukraine.

Macroeconomic impact of the COVID-19 pandemic and the war in Ukraine

The COVID-19 pandemic which emerged at the end of 2019 in China and then gradually spread to other countries on all continents (Alexander, Gor-balenya et al. 2020) resulted in unmatched socio-economic impacts in the 21st century (Zoumpourlis, Goulielmaki et al. 2020). According to the World Health Organization (WHO 2024), in March 2024, this pandemic caused deaths of more than 7 million people and affected approx. 775 million people. In addition to its social impact, the pandemic brought about significant economic consequences on virtually all continents (Asahi et al. 2021), (Nebehay 2020). In the initial phase of the pandemic, i.e. in the first half of 2020, a collapse in the economic and financial situation of enterprises, predominantly those operating in the tourism and hospitality and also catering industry was recorded (Bloomberg 2023). It resulted from travelling restrictions, closing public places, including tourist attractions, and advising against travelling by individual governments, which tried in more or less restrictive ways to curb the spread of the pandemic. Many employers, in view of the situation, decided to lay off some of their employees or temporarily suspend their operations (Romm 2020), (Fairlie 2020), (Cheng 2020). Remote work had also become increasingly popular (Braesemann 2022). This form of employment

gained so much popularity and turned out so effective that it has been adopted permanently in many organizations and institutions even after the end of the pandemic was declared and the number of virus infections was considerably reduced (Temko 2023).

After the initial shock, in the second half of 2020, the restrictions were gradually lifted and in effect a certain recovery of individual economies took place. The revival of individual economies progressed and definitely accelerated along with the invention of vaccines and introducing vaccination on a massive scale. Despite a strong economic rebound after the initial lockdowns in early 2020, in the later phases of the pandemic many countries began to suffer long-term economic effects. Several countries experienced high inflation rate, which affected the entire world (e.g. especially in the developing countries) (United Nations 2023). Some of the economic consequences of the pandemic turned out to be longer lasting than expected, as the pandemic exposed serious weaknesses in the systems that had previously been in place and thus significant changes were needed. This included the organization of labor (Granja et al. 2023).

In February 2022, Russia's military attack on Ukraine and the outbreak of a full-scale armed conflict caused a shock to the world economy yet again (Harris 2022). Poland suddenly became a frontline state with all its economic and social consequences (Dębkowska et al. 2023). The outbreak of war in Ukraine has taken its toll on the organization of the world trade, especially regarding raw materials (mainly energy resources). The economic restrictions imposed on Russia resulted in a sharp increase in the prices of raw materials and commodities on the world markets. In addition, the suspension of food exports from Ukraine caused a rapid increase in food prices and inflation in many countries, as well as a general downturn in the global economy (Bigg 2023).

Following the invention of the vaccine and the mass vaccinations implemented in 2021 and early 2022, the economic situation was gradually normalized (Figure 1). After the initial shock in the second quarter of 2020, the subsequent quarters of 2020 and 2021 recorded positive trends in the growth of gross domestic product. The outbreak of war in Ukraine triggered a reversal of these positive trends. The unprecedented consequences of the war were observed in many macroeconomic aspects. Among other things, in the form of a shocking increase in the price of oil and natural gas and other raw materials, which resulted, e.g., in production restrictions in certain sectors and industries and had a huge impact on the economic downturn.

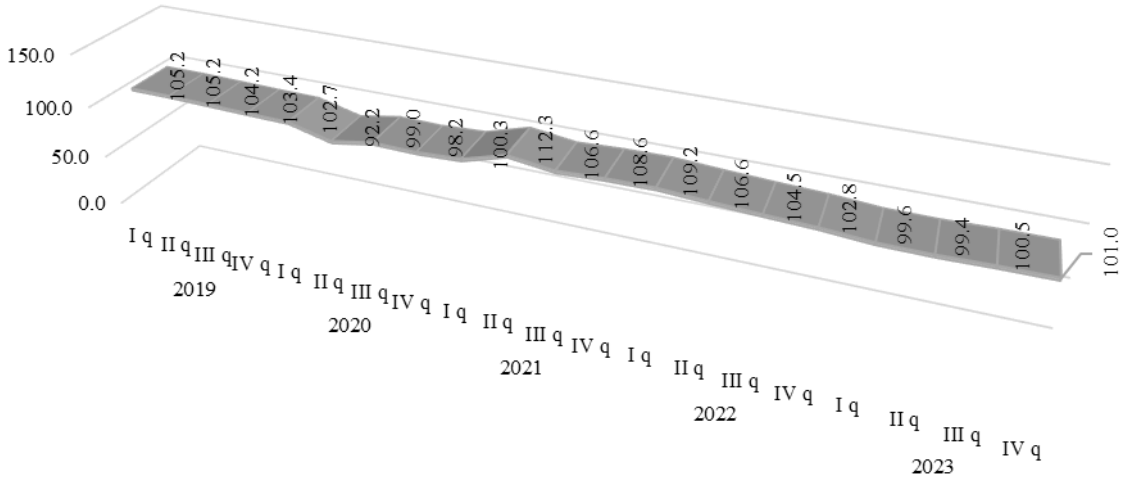

Figure 1. Dynamics of Poland's gross domestic product at constant prices[1] in quarterly terms in 2019 – 2023.

Source: author's compilation based on the data provided by (GUS 2024).

[1] Constant prices calculated as growth rates based on values in constant average prices of the previous year.

Until the outbreak of the pandemic, Poland's economy was among the top economies of the European Union Member States. As a result of the crisis caused by the COVID-19 pandemic, GDP declined for the first time in more than thirty years (by 2% in 2020). 2021 brought about a rapid recovery – GDP and its growth by 6.9%. Russian aggression in Ukraine resulted in a significant slowdown experienced by the Polish economy. This was observed particularly in the second and third quarters of 2023. According to Statistics Poland, the Polish economy reached a plateau observed throughout 2023. GDP growth of 0.2% year-on-year was the worst result since the recession in the 1990s and the poorest outcome since Poland's accession to the EU structures (excluding the 2020 pandemic year) – and three times lower performance than the average economic growth in the European Union in 2023.
The negative consequences of the war in Ukraine have also become apparent through a sharp rise in inflation (Figure 2). Consumer Price Index (CPI) dynamics. During the pandemic period, inflation rose mainly in the third and fourth quarters of 2021, reaching 7.7% in the last quarter of that year. As a result of the outbreak of war in Ukraine, it even recorded a surge not seen in Poland since the beginning of the economy transformation, i.e. since the early 1990s.

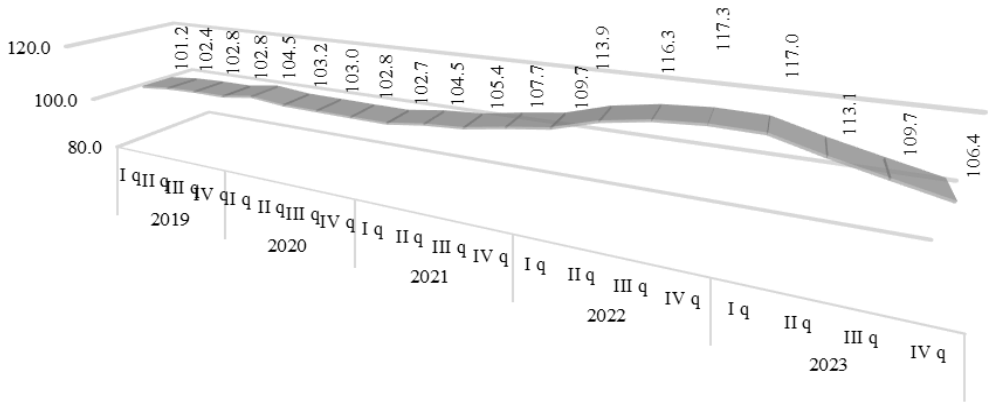

Figure 2. Consumer price index by quarter in Poland in 2019- 2023.

Source: Data provided by (GUS 2024).

Its highest level was recorded in the fourth quarter of 2022 and the first quarter of 2023. In subsequent periods, its bouts even to the level before the outbreak of war in Ukraine were noted. High inflation rate generated wage pressure, mainly in enterprises. Average monthly wages increased by more than 45% between 2019 and 2023, with the highest dynamics in this regard observed in 2022-2023 (Figure 3)

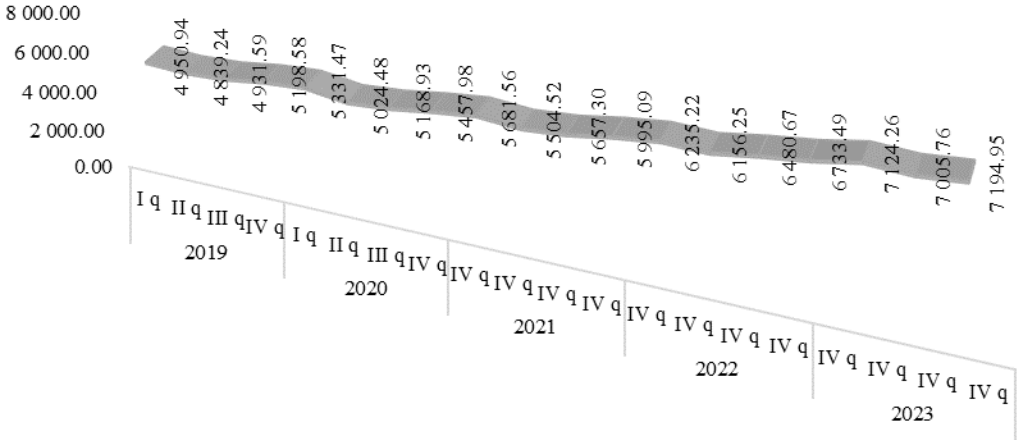

Figure 3. Average monthly wages by quarter in Poland in 2019-2023.

Source: Data provided by (GUS 2024).

The highest growth rate in average wages was observed in 2022-2023, which additionally fueled the scale of inflation and destabilized Polish economy. Wage pressure affected primarily Polish enterprises due to the noticeable shortage of workers, especially the highly skilled ones.

General financial situation of Polish enterprises in the time of COVID-19 pandemic and the war in Ukraine

After the initial shock caused by the Covid-19 pandemic outbreak in 2020 the situation of Polish enterprises normalized, to some extent, in the following two years (Table 1).

Table 1. Selected financial data of the non-financial enterprise sector in Poland in 2019-2023 (at 2023 prices[2]).

Specification	Years				
	2019	2020	2021	2022	2023
	million PLN				
Total revenue	5447596	5196577	5980189	6728784	5 289 216
including from sales of products, goods and materials	5293891	5021640	5766712	6500788	5 110 498
Total costs	5213002	4971814	5588932	6323828	5 005 122
including cost of products, goods and materials sold	5050621	4775430	5441194	6103762	4 830 059
Gross financial result	234594	224763	391257	404956	284 094
Net financial result	192997	181943	328478	340402	228 568
Long-term liabilities (year-end balance)	769372	856307	862146	815860	554 795
Short-term liabilities (year-end balance)	1382979	1364675	1592128	1652143	1 283 434

Source: author's calculations based on the data provided by (GUS 2024).

The decline in revenues and financial results recorded in 2020 was compensated for in the two years to follow. The outbreak of war in Ukraine in 2022 had its negative effects on the non-financial business sector in Poland in 2023. It coincided with a general economic downturn both in the country and worldwide. The sanctions imposed on Russia and the systematic decoupling of energy resources from that country had a negative impact on the overall financial situation of enterprises and the condition of Polish economy. The financial consequences of the outbreak of the Covid-19 pandemic and the war in Ukraine on the non-financial enterprise sector can be assessed even more clearly by measuring the dynamics of revenues, costs and financial results (Table 2).

Table 2. Dynamics of the selected financial figures of Polish non-financial enterprises in 2019-2023 (at 2023 prices)

Specification	Years				
	2019	2020	2021	2022	2023
	%				
Dynamics of total revenues (same period previous year=100)	100	95.4	115.1	112.5	78.6

[2] Adjusted for CPI inflation.

Dynamics of total costs (same period previous year=100)	100	95.4	112.4	113.1	79.1
Dynamics of gross financial result (same period previous year=100)	100	95.8	174.1	103.5	70.2
Dynamics of net financial result (same period previous year=100)	100	94.3	180.5	103.6	67.1
Dynamics of long-term liabilities (same period previous year=100)	100	111.3	100.7	94.6	68.0
Dynamics of short-term liabilities (same period previous year=100)	100	98.7	116.7	103.8	77.7

Source: author's compilation based on the data provided by (GUS 2024).

The compilation of the presented data clearly shows that the business sector was more affected by the outbreak of war in Ukraine than by the outbreak of the COVID-19 pandemic. This state of affairs could have been influenced by at least several factors of macroeconomic nature. First and foremost, the marked slowdown of Polish economy in the period immediately following the outbreak of COVID-19 pandemic caused by the imposed restrictions, as mentioned earlier, but also the uncertainty experienced by entrepreneurs regarding the further course of the pandemic. In addition, many enterprises had to adjust to new operating conditions and even temporary closure (tourism and hospitality as well as catering). Companies operating in the IT sector benefited from this situation, which mitigated, to a certain extent, the negative picture of the non-financial business sector in 2020. The situation was different after the outbreak of war in Ukraine. The initial shock caused by restrictions imposed on economic contacts with the aggressor – Russia was not reflected in the financial performance of enterprises. The impact of war was evidently shifted from 2022 to 2023. Businesses substantially reduced their propensity to take on longer-term debt in the context of uncertainty regarding the political and economic situation in the world and in Poland due to the ongoing war. The key issue for Poland's business sector was concern for liquidity as a major condition for survival in these difficult times.

Financial liquidity of the business sector in the conditions of variable micro-environment

Uncertainty and risk, as inseparable factors shaping the functioning of enterprises, take on particular importance in the unpredictable and non-standard conditions in which they operate on a daily basis. In a stable and predictable macroeconomic situation, the decision-making process in enterprises is subject to less risk than in the reality of dynamic changes in the macro-environment. Entrepreneurs are focused on maintaining the ability to settle current obligations and thus avoid the risk of insolvency and, consequently, bankruptcy. Liquidity means how easily an asset can be converted into cash without significantly affecting its price. Generally, the static measurement of financial liquidity in non-financial enterprises is conducted using three basic indicators, which have postulated values defined in the source literature. Table 3 presents standpoints of the leading Polish researchers discussing financial liquidity in this area. There is no consensus on the benchmark values of current and quick liquidity ratios (Korol 2013). The basic picture of enterprise liquidity is shown by the Current Ratio (CR), also known as the third-degree liquidity ratio. It allows, in a general way, to determine the enterprise ability to settle its short-term obligations with current assets, including cash, receivables and inventory according to the following formula:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The range of postulated values (depending on the literature items) is: 1.2-2.5, or 120-250%, respectively. Quick Ratio (QR), also known as higher liquidity ratio or second-degree liquidity ratio – also referred to as the acid test ratio, measures enterprise ability to meet its short-term liabilities using its most liquid assets, i.e. excluding inventory from current assets.

Table 3. Postulated values of financial liquidity indicators according to selected authors

Indicator name	Reference degree by author									
	M. Sierpińska	M. Jarzemowska	J. Ostaszewski	F. Bławat	M. Nowak	A. Skowronek - Mielczarek	L. Bednarski	W. Gabrusewicz	W Dębski	T. Waśniewski
Current Ratio	1.2-2.0 (120%-200%)	1.3-2.0 (130%-200%)	1.6-1.9 (160%-190%)	1.5-2.5 (150%-250%)	1.6-1.8 (160%-180%(	1.5-2.0 (150%-200%)	1.5-2.0 (150%-200%)	1.5-2.0 (150-200%)	2.0 (200%)	2.0 (200%
Quick Ratio	1 (100%)	1 (100%)	0,9-1.0 (90%-100%)	1.0-1.5 (100%-150%)	0.7-0.9 (70%-90%)	1 (100%)	>1 (>100%)	1-1.2 (100%-120%)	>1 (>100%)	1 (100%)
Cash Ratio	-	0.1-0.2 (10%-20%)	-	0.05-0.2 (5%-20%)	0.05-0.35 (5%-35%)	-	-	0.05-0.15 (5%-15%)	0.1-0.2 (10%-20%)	0.1-0.2 (10%-20%)

Source: (Korol 2013)

It is determined according to the following formula:

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$$

The theoretical – postulated value for this indicator usually equals approx. 1, i.e. approx. 100%

Cash Ratio – immediate liquidity – Cash Ratio (CHR) or first-degree liquidity ratio. Its formula includes the ratio of cash and cash equivalents to current liabilities, as follows:

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Cash Equivalents}}{\text{Current Liabilities}}$$

It indicates enterprise ability to cover its short-term liabilities from cash reserves, i.e. as soon as they are due. Its theoretical value, depending on the source literature items, should range from 0.05 to 0.035, or 5% to 35%, respectively.

Liquidity ratios provide an insight into a company liquidity situation and its ability to manage cash flow effectively. Liquidity ratios help investors, creditors and analysts assess the company ability to manage short-term financial obligations. However, it is important to consider industry standards and specific business circumstances when interpreting these indicators, as what constitutes a healthy liquidity situation can vary depending on a sector and a company.

A higher cash ratio indicates a greater ability to cover short-term obligations with cash on hand. However, an excessively high ratio signals over-liquidity problems. The reasons for over-liquidity can be found in the improperly structured asset and capital structure of an enterprise. The effect of over-liquidity takes the form of economically unjustified immobilization of capital in current and non-current assets and an increase in the opportunity cost. Ultimately, this negatively affects the profitability of an enterprise.

The characteristic feature related to the liquidity of Polish business sector, observed in 2019-2023, is manifested in a very good situation in this regard, even despite great turbulence in the global and Polish economies caused by the COVID-19 pandemic and the war in Ukraine. This is evidenced by all the above described liquidity ratios specified for the Polish enterprise sector (Tab. 4).

Table 4. Liquidity ratios of the non-financial enterprise sector in Poland in 2019-2023

Specification	Years				
	2019	2020	2021	2022	2023
	%				
Third-degree liquidity ratio (CR)	143.2	147.1	151.7	152.8	151.2
Second-degree liquidity ratio (QR)	100.9	104.8	107.9	106.0	107.2
First-degree liquidity ratio (CHR)	40.9	46.1	45.6	41.5	39.7
Difference between ratios	percentage points				
CR-QR	42.3	42.3	43.8	46.8	44
CR-SHR	102.3	101	106.1	111.3	111.5
QR-CHR	60	58.7	62.3	64.5	67.5

Source: (GUS 2024).

The CR and QR ratios are within the norms provided by most of the researchers cited in Table 2. The CHR ratio is even slightly too high, signaling a small over-liquidity. Out of the three liquidity ratios, only the CHR ratio presenting immediate liquidity shows a downward trend in 2020- 2023. Before the outbreak of the pandemic, an average of 40.9% enterprise current liabilities were covered by cash and cash-equivalent other current assets. In 2020, the outbreak of the COVID-19 pandemic and the widespread negative effects of the lockdown in the Polish economy, resulted in significant reductions regarding the propensity for short-term debt of enterprises bearing greater liquidity risk than long-term liabilities. A growing gap between the indicator showing cash liquidity and other liquidity indicators is noticeable. This is primarily indicative of the growing problems in inventory and short-term receivables management during the pandemic and war in Ukraine.

In order to identify the reasons for different behavior of the CHR ratio as compared to other liquidity indicators, Pearson linear correlation coefficient was applied (Garen 1998) (Elsevier 2023) in accordance with the formula:

$$r_{xy} = \frac{\sum\left(x_i - \bar{x}\right)\cdot\left(y_i - \bar{y}\right)}{\sqrt{\sum\left(x_i - \bar{x}\right)^2 \Sigma\left(y_i - \bar{y}\right)^2}} = \frac{\frac{1}{n}\sum x_i y_i - \overline{xy}}{\sigma x \cdot \sigma y} = \frac{cov(x,y)}{\sigma x \cdot \sigma y}$$

where x_i, y_i – i-th observation values of population X and Y, $\bar{x}, \bar{y}$ – mean values of population X and Y, σ_x, σ_y - standard deviation of population X and Y, n – number of observations.

Pearson's r adopts values in the range [-1,1] informing about the correlation strength. The interpretation of r correlation, presented as follows, is commonly used in economic research (absolute values): 0.00–0.10 negligible correlation, 0.10–0.39 weak correlation, 0.40–0.69 moderate correlation, 0.70–0.89 strong correlation, 0.90–1.00 very strong correlation (Schober et. al. 2018).

The results presented in Figure 4 clearly show the dependence of immediate liquidity on basically three factors, with two of them being endogenic (long-term and short-term liabilities) whereas inflation is typically an exogenous factor.

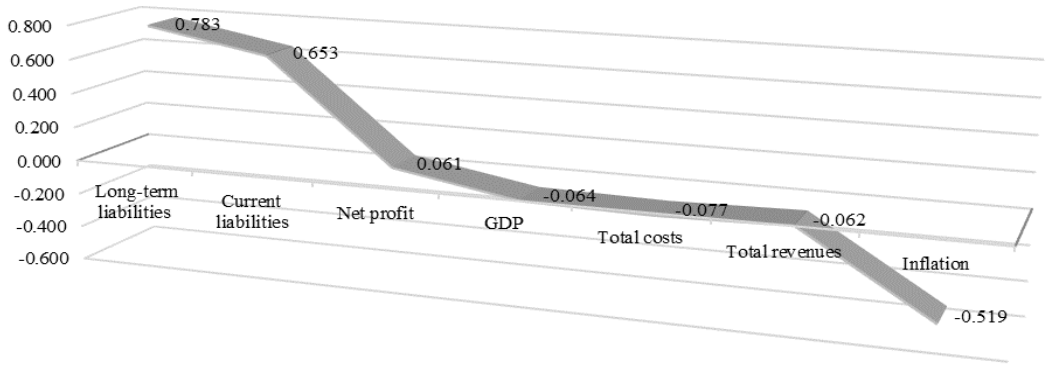

Figure 4. Pearson correlation coefficient for the dependence of first-degree liquidity on selected exogenous and endogenous factors in Poland in 2019-2023.

Source: author's calculations

In light of the correlation study results, covering the period 2019-2023, a strong correlation between the value of cash liquidity ratio and the level of long-term liabilities (0.783) can be indicated. Short-term liabilities, in turn, moderately influenced the level of cash liquidity (0.653). Among the exogenous factors, only inflation had a moderate effect on the level of cash liquidity (-0.519). At the same time, as opposed to the endogenous factors, the level of inflation was negatively correlated with the level of cash liquidity. The other selected endogenous factors, such as net profit, total revenues, or total costs, and also gross domestic product as a factor reflecting the condition of the economy (exogenous factor) showed virtually no correlation with cash liquidity of Poland's business sector.

Conclusions

As the results, among others, of the presented study show, for Polish entrepreneurs the pandemic has already become a memory of the past, and the war in Ukraine a present significant problem with an uncertain scenario and financial consequences. Surviving this period in a reasonably good economic shape is topping the list of challenges. Businesses benefiting from the good global economic situation until the outbreak of the COVID-19 pandemic clashed, in 2020, with a periodic economic shutdown and widespread restrictions unobserved for many years. Financial support programs implemented in many countries, including Poland, allowed businesses to survive this most difficult initial period of the pandemic. Gradual unblocking of the economy enabled regaining its pre-pandemic level of operational efficiency fairly quickly. The second blow inflicted to the corporate sector in 2022, taking the form of the economic consequences of Russia's armed aggression against Ukraine is already proving much more dangerous in this context. Its effects are already evident in the form of a considerable economic slowdown worldwide (including Poland), a sharp rise in prices and the shaken fundamentals of global economic prosperity, mainly due to turbulences in the energy, agricultural and metal raw materials markets. In addition, the war in Ukraine has caused huge repercussions on the capital and money markets.

The Polish economy appears to have largely put the effects of the COVID-19 pandemic behind it. The pandemic period had its negative consequences in some industries such as tourism, hospitality and catering. It also resulted in positive effects, especially in terms of the large-scale implementation of remote work. Entrepreneurs reorganized their businesses relatively quickly to survive the lockdown and the related restrictions. One of the key areas of management during the discussed period was liquidity management as a strategic area of business financial management in difficult times. It was of paramount importance, in view of the apparent effects of the pandemic in the corporate sector in 2020, when a year-on-year decline in revenues reached 4.6 percentage points and a decline in gross and net financial results amounted to 4.2 percentage points and 5.7 percentage points, respectively. Long-term debt also increased sharply (up 11.3 percentage points). A decline was also observed in short-term liabilities, which pose a greater threat to maintaining liquidity than long-term liabilities (due over 12 months). The gradual liberalization of the economy improved significantly the basic financial parameters of Polish enterprises. The

efficiency of operations, measured by profits earned, improved noticeably. Having perceived an opportunity to make up for the previous year losses, entrepreneurs increased their interest in higher operating expenditure using debt financing, mainly a short-term one.

The outbreak of war in Ukraine has clearly changed the approach to enterprise financial management. The war in Ukraine has also caused other, than the pandemic, economic effects in Poland. Poland became a frontline state, with all the negative consequences of this situation. It also virtually immediately broke off or significantly reduced business contacts with Russia as the aggressor. Faced with an uncertain future, violent turbulence in raw material markets, disrupted supply chains, and the withdrawal of many companies from the eastern market, financing operations with long-term debt (most often associated with investment financing) was limited. Instead, companies reached for short-term financing, thus responding precisely to the increased financing needs that emerged on an ongoing basis. In the first year of the armed conflict, it was possible to maintain basic economic parameters at a good level. The ongoing war in 2023 left a much deeper mark on the Polish economy and also on the corporate sector. One of the main problems was a sharp rise in prices and unprecedented, since the 1990s, inflation rate. In addition, the global economic downturn, in the face of the armed conflict, had its consequences in the financial situation of the Polish business sector. This mainly relates to operating efficiency measured by the level of revenues, costs and financial results. Importantly, this sharp collapse in operating efficiency has not been seen in the area of liquidity.

The basic liquidity ratios, i.e. the CR and QR ratios, hardly reacted to the effects of the pandemic and the war. Only the CHR ratio, identifying the ability to repay current liabilities with cash-like assets, adopted a consistent downward trend after the outbreak of the pandemic. There are several reasons for this situation. Among the most important ones the level of long-term and short-term liabilities can be listed, which constituted the financial supply in the corporate sector. A decline in cash ratio with a relatively stable level of the other liquidity ratios demonstrates the growing risks in inventory and short-term receivables management. The CR and QR[3] ratios maintain a relatively stable mutual gap (fluctuating between 42.3 pp and 46.8 pp), while a continuously widening gap between these two ratios against the CHR ratio is observed. In both cases, the increase ranged from 8.8 pp for the QR up to 10.5 pp for the CR.

The reasons for this situation are primarily to be found in high inflation rate resulting in the depreciation of monetary assets. Bank accounts of enterprises in Poland are practically interest-free or the interest rate remains symbolic. Thus, maintaining high cash balance, above the so-called cash minimum, was economically unjustified in the period under study. Moreover, in the unstable macro-environment period, problems began to emerge with growing inventories and collecting receivables from customers. Maintaining high inventories resulted, among other things, from problems with sales, but also from uncertainty about contractors' deliveries especially in the first year of the war. In 2023, the economic downturn, but also the organization of new supply chains, affected the reduction of inventory levels. However, another threat emerged in the form of increasing short-term receivables signaling growing payment problems faced by customers. Having the above in mind, it may be concluded that despite the extraordinary turbulences in the macro-environment in recent years, the non-financial enterprise sector in Poland has maintained good shape in the area of liquidity, however, 2023 has already experienced visible signs of possible problems in the years to come if the armed conflict in Ukraine continues and destabilizes the global economy.

[3] The QR ratio differs from the CR ratio only in the absence of inventory as a source of liquidity.

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