THE EFFECTIVENESS OF WORKING CAPITAL MANAGEMENT STRATEGIES IN MANUFACTURING ENTERPRISES

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Abstract: The paper presents the results of a study aimed at identifying and assessing the efficiency of working capital management strategies in enterprises. The analysis focuses on the volumes of net working capital and its cycle (dependent variable), as well as the conversion cycles of its main components (independent variables). The study comprises the entire population of manufacturing enterprises in Poland covered by public statistics (nearly 14 thousand entities), divided into size categories (small, medium and large). The long-term analysis covers the period of 2007-2018. The study makes use of the measures that characterise working capital management strategies and their effects including net working capital volumes and working capital cycles. The study also employs measures related to correlations, similarity, density, positioning and classifying, as well as descriptive statistics. The effect of the study is the verification of three research hypotheses related to the characteristics, correlations, profile similarities and identification of working capital strategies in manufacturing enterprises.

Keywords: working capital management, efficiency, strategies.

1. Introduction

The paper aims to identify corporate working capital strategies and assess their effectiveness. The study is based on the long-standing research of the entire population of manufacturing enterprises in Poland (13,857 entities, accounting for 81.5% of all profitable entities, 2,045 in operation, representing PLN 1,368bn revenues from sales, 41.0% of value added of the sector of enterprises, with more than 9 employees), included in public statistics, divided into size categories (small, medium and large). The paper gives special attention to net working capital strategies and their cycles (dependent variable), as well as the conversion cycles of working capital components (independent variables).

The main objective of the empirical part of the paper is to present a comparative assessment of manufacturing enterprises in 2007-2018, and, in particular, to:

- – identify relevant characteristics and correlations,
- – present a comparative assessment of profiles,
- – identify working capital management strategies.

The effectiveness of working capital management is assessed on the basis of a number of measures which are presented in the methodological part of this paper, including the cycles and conversion cycles of working capital components. The existing correlations are analysed with the use of a correlation measure, and the movement of objects is assessed using a density measure. Company profiles (size categories: small, medium and large) are analysed using a similarity measure. The identification of working capital strategies is based on positioning in relation to cycles and conversion cycles, as well as descriptive statistics.

The scope of the research study (all manufacturing enterprises) and its long-term character justifies formulating conclusions of a general and universal character.

The verification of the hypotheses related to research objectives are presented in the summary. The hypotheses related to the population of manufacturing enterprises are as follows:

H1 – Net working capital cycle is correlated with: a) financial liquidity, b) cash position (short-term investment), and c) profitability of sales,

H2 – Company profiles according to PKD (Polish Classification of Activities) have the greatest impact on the net working capital cycle and its components in the case of small and large companies,

H3 – The dominating working capital strategy is a moderate strategy adopted in the majority of small and medium enterprises.

The presented results and considerations constitute part of an extensive research study of the institutional sector of enterprises in Poland and part of a series of publications.

2. Literature review

An important role in a company's short–term management is played by working capital. It is part of a company's equity engaged in financing current assets (Brigham, and Houston, 2007). The objective of working capital is to mitigate risks resulting from the lack of use of or losses in current assets (Gołębiowski, and Tłaczała, 2009). It is identified (related to) with working capital management, as well as financial liquidity measures (Wędzki, 2003).

Working capital management is a process of influencing the volume and structure of current assets and the relevant sources of financing (Adam, 2007). In the first place, the process aims to maintain financial liquidity, but it also affects a company's efficiency (Filbeck, and Krueger, 2005). Its objective is to optimise the costs of maintaining and financing current assets (Andrew,

and Gallagher, 2007). All these activities are conditioned by ensuring low risk, enhancing the effectiveness of working capital management (Groppelli, and Nikbakht, 2006).

The effectiveness of working capital management is measured by the working capital cycle, which results from its circulation movement – going through all circulation phases creates a cash circulation cycle (Richards, and Laughlin, 1980). The increased effectiveness of working capital management is achieved through the shortening of its cycle (Czekaj, and Dresler, 2002).

Activities related to working capital management are reflected in strategies. The choice of strategy implies specific profit-risk relations, and is strongly correlated with managers' attitudes (management styles) (Brounen, De Jong, and Koedijk, 2004), while a company's financial standing is an objective factor (Graham, and Harvey, 2001). Possible strategies (conservative, aggressive) (Kreczmańska-Gigol, 2015) with regard to current asset management do not determine the choice of the same financing strategies and vice versa (Sierpińska, and Wędzki, 2001). It leads to adopting combinations of strategies, including the adoption of moderate strategies (Cicirko, 2010).

A review of the results of research studies of the conditions, effectiveness and efficiency of working capital management does not offer explicit solutions which mainly concern relations between the effects of management strategies and financial liquidity levels (Deloof, 2003) (Garcia-Teurel, and Martinez-Solano, 2007) with implications for profitability at a company's general level (return on equity, assets and sales) (Raheman, and Nasr, 2007; Shin, and Soenen, 1998), and not only with regard to working capital. The authors also seek to determine the impact of investment (a surrogate of corporate development) on financial liquidity and the adopted working capital strategies (Oppler, et al., 1999). Attention is also given to the implications of the level of indebtedness and financial leverage for the choice of receivable and inventory management strategies (Chiou, Cheng, and Wu, 2006). Other publications show that working capital requirements are strongly correlated with and directly proportional to company size (Hill, Kelly, and Highfields, 2010; Petersen, and Rajan, 1997).

Empirical research in the field of working capital management, adopted strategies and resulting correlations is also conducted in Poland (e.g. Jędrzejczak-Gas, 2014; Zimon, 2014, Michalski, 2007; Bolek, and Pastusiak, 2014; Koralun-Bereźnicka, 2013).

Generally, literatures do not offer sufficient empirical research on the conditions and determinants of working capital management strategies, especially with regard to the combined impact of its components. Quantitative research focuses on specific individual relationships with some attention given to qualitative aspects; research studies are not comprehensive in character and are based on small groups of objects, which does not allow for formulating general and universal conclusions.

3. Methods

The conducted analysis assumes that gross working capital (WC$_G$) represents all the sources of current asset financing. In other words, it is the total sum composed of inventories (INV), short-term receivables (REC) and cash (i.e. short-term investments – STI). This capital, when reduced by short term liabilities (STL), represents net working capital (NWC). In other words, it is part of a company's equity (EQ) increased by long-term liabilities (LTL), engaged in financing current assets (CA), thus beyond fixed assets financing (FA). Changes in net working capital are also calculated (dNWC=NWC$_t$–NWC$_{t-1}$), having an impact on cash flows.

$$WC_G = INV + REC + STI; NWC = WC_G - STL$$
$$NWC = EQ + LTL - FA \tag{1}$$

The effectiveness of net working capital management is measured by the net working capital cycle (NWCC) and the cycles of its components: days of inventory coverage (IT), days of short–term receivables coverage (CP) and days of short–term liabilities coverage (PL).

$$CAC = IT + PL \;;\; NWCC = CAC - PL \;;\; IT = \frac{\overline{INV} \cdot d}{C_S} \;; CP = \frac{\overline{REV} \cdot d}{S} \;; PL = \frac{\overline{STL} \cdot d}{C_M} \tag{2}$$

where:

CAC – days of current assets coverage,

C$_S$ – costs of sales of products, goods and materials,

C$_M$ – cost of materials, energy, services, etc. (operating expenses),

S – net revenues from sales of products, goods and materials,

d – number of days in period.

Note: geometric average of quarterly values INV, REV, STL.

The following values are considered in the analysis of working capital correlation measures: financial liquidity ratios – current ratio (CR) and quick ratio (QR), return on revenues from sales (RRS), revenue from sales (S) and operating costs (C) (i.e. costs of sales of products, goods and materials, selling costs and overheads – operating expenses), and cash (i.e. short-term investments – STI).

$$CR = \frac{\overline{CA}}{\overline{STL}} \;; QR = \frac{\overline{CA} - \overline{INV}}{\overline{STL}} \;; RRS = \frac{GPS}{S} \tag{3}$$

where:

GPS – gross profit (loss) from sales.

Note: geometric average of quarterly values CA, INV, STL.

The occurrence of correlations is analysed with the use of a correlation measure – Pearson's coefficient (r). The statistical testing assumes critical level of significance $\alpha = 0.05$, which is referred to the value of test probability (p-value).

The adopted descriptive statistics include the following: mean value, median (5th decile D5), minimum, maximum, relative dispersion (maximum-minimum/mean), standard deviation, decile distribution and its distribution function, and decile spreads.

The assessments of company profiles by size categories are based on the taxonomic measure of similarity of structures (TMS) (Kaczmarek, 2012):

$$TMS = \sum_{i=1}^{N} min\ \left(p_{ij},\ p_{ik}\right) \tag{4}$$

where:

p_{ij}, p_{ik} – share of the i–th object in structure j, k,
N – number of objects.

This measure assumes values <0 − 1>, and the closer the value is to the unity, the greater the similarity between the compared structures.

The first stage of identifying a working capital management strategy assesses above average cycles of current assets (CAC) and short–term liabilities (PL) (average as a cutoff point):

- quadrant 1 – below average CAC and above average PL,
- quadrant 2 – below average PL and above average CAC,
- quadrant 3 – below average CAC and PL,
- quadrant 4 – above average CAC and PL.

The degree of object density is analysed using the elliptical density measure (Kaczmarek, 2019):

$$DM = \sqrt{s_x^2 s_y^2 \cdot \left(1 - r_{xy}^2\right)} \tag{5}$$

where:

s_x^2, s_y^2 – variance of variable x, variance of variable y,
r_{xy}^2 – Pearson linear correlation coefficient between x and y.

The density measure describes the surface area of the ellipse covering the set of objects.

The final identification of management strategies and classification of objects is based on the criterion of the decile distribution of the net working capital cycle (NWCC) (1st decile D1 and 9th decile D9 – distinct leaders and outsiders). It is a univariate classification with a synthetic measure NWCC, explained by its components (IT, CP, PL):

- aggressive strategy – NWCC < D1,
- conservative strategy – NWCC > D9,
- moderate strategy – D1 < NWCC < D9.

The adoption of this classification is preceded by a test of compliance of the result of discriminating companies which implement the same working capital strategy, based on criterion NWCC, as well as CAC and PL (median as a cutoff point).

The following company size categories are employed: small (10-49 employees), medium (50-249), large (250 and more).

4. Results and discussion

4.1. General characteristics of working capital management

The assessment of net working capital management (NWC) in the analysed manufacturing enterprises leads to several general conclusions which provide a basis for an in-depth analysis. Firstly, the trend of changes in the gross working capital cycle (CAC) is positively and strongly correlated (statistically significant) with the short–term liabilities cycle (PL) ($r = 0.74$, p-value $= 0.000...$). Secondly, apart from the existing correlation, changes vary in terms of their intensity. This phenomenon is clearly visible until the end of 2012, and its observable effect is a strong contrary change in the net working capital cycle (NWCC) in relation to CAC and PL. The subsequent periods record NWCC changes of lower amplitude, but still contrary to CAC and PL (Figure 1).
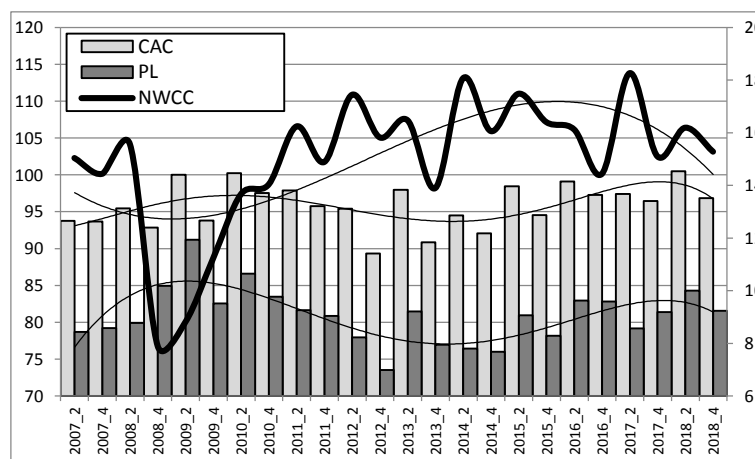

Figure 1. The cycles of current assets (CAC), short-term liabilities (PL) and net working capital (NWCC), manufacturing enterprises in 2007-2018 (days). Note: NWCC – right axis. Source: own elaboration on the basis of databases on non–public access, GUS Warszawa, Department of Enterprises; Pont Info Warszawa, Economy System SŚDP, 2019.

The characteristics of NWCC components are different in manufacturing enterprises. The inventories cycle shows the highest relative stability (standard deviation SD 3.6%). Changes occur in two stages, with a considerably high increase in IT after the period of stability as of 2015. CP is characterised by two periods of increase and two periods of decrease (sinusoidal pattern), higher changeability (SD 4.5%), and seasonality – the first six months usually show higher values. PL is characterised by two periods of increase and one period of decrease (sinusoidal pattern), and the highest changeability (SD 4.6%).

Basic descriptive statistics for NWCC point to relatively high values of 8th and 9th decile. The latter shows the highest increases in the analysed years. Decile spreads increase, and the distribution function moves considerably in a positive direction as compared with the value in the first year. The average pace of changes for 9th decile is positive – similarly to deciles 2-8, and NWCC mean value – but nearly threefold higher. As of 2013, there is a considerable difference between 9th decile and NWCC mean value, which is between 3rd and 4th decile (Figure 2).
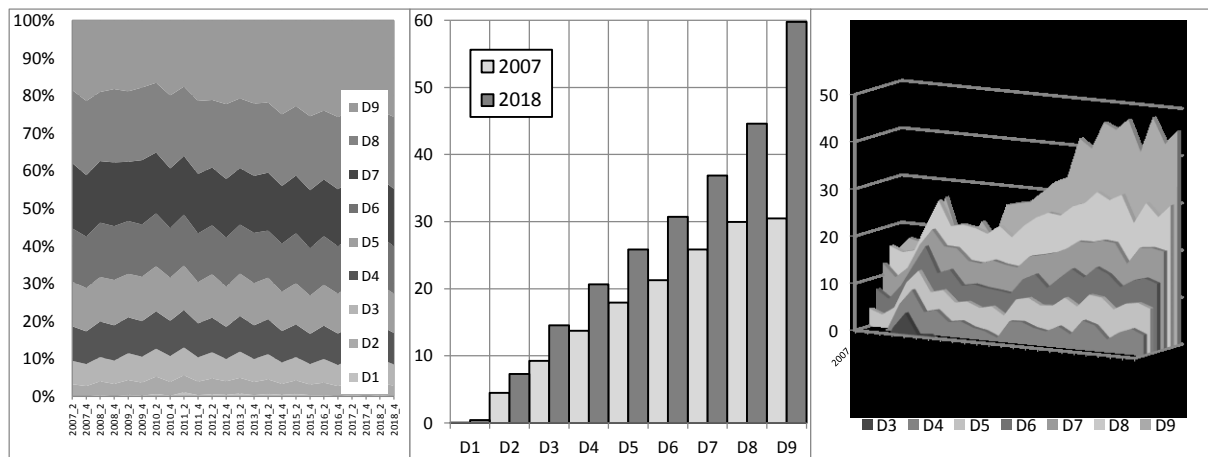

Figure 2. Basic characteristics of NWCC, manufacturing enterprises in 2007-2018. Note: left panel – decile distribution, middle panel – decile spreads, right panel – decile minus mean value.

NWCC changes can be considered in the context of changes in business cycles in the institutional sector of companies measured by value added (VAD) creation dynamics. In the mid–term approach, until 2011, VAD changes correspond to respective NWCC changes. The shortening of the net working capital cycle results from longer liabilities cycles, higher than in the case of receivables, accompanied by a slight increase in the inventories cycle. The economic slowdown of 2012-2013 does not have such an impact as the previous one (2008-2009), and NWCC and VAD changes are slight and inversely proportional. From the perspective of NWCC components, the last readings lead to new observations – extended inventories and liabilities cycles accompanied by shortened receivables cycles (Figure 3).
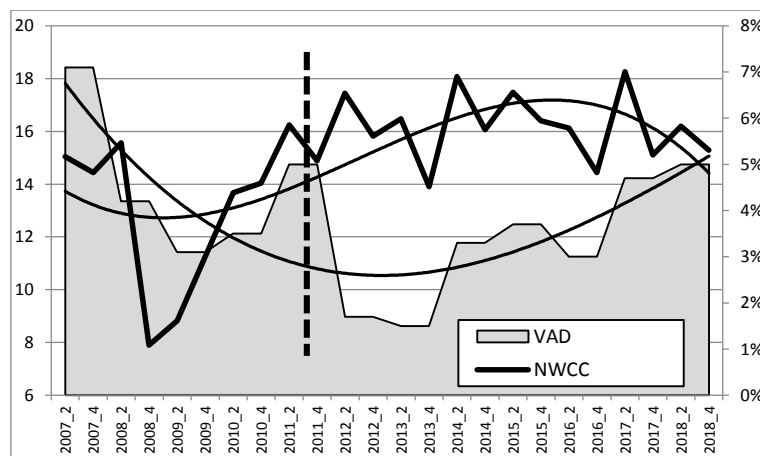
Figure 3. Pace of changes in value added (VAD) and net working capital cycle (NWCC), manufacturing enterprises in 2008-2018. Note: VAD – right axis. Source: same as Figure 1.

4.2. Basic correlations in the area of working capital management

The cycle of net working capital and its components is linked by the volumes of sales (S) and costs (C), inventory volumes (INV), receivables (REC) and short–term liabilities (STL). These three categories determine the volume of net working capital (NWC) and its changes (dNWC) and, consequently, the volume of required funds for financing its growth and release in the periods of decline.

The analysis of changes in manufacturing enterprises' inventories (INV), receivables (REC) and short-term liabilities (STL) points to their steady growth with the average pace of changes at 3.26%, 2.25% and 2.69%, respectively. These paces are close to the average pace of sales (S – 2.56%) and costs (C – 2.64%) – the respective curves show their steady growth. The "S – REC" correlation is 0.97, and for "C – STL" 0.96, while for "C – INV" 0.99 (for each pair p-value = 0.000…).

Changes in net working capital dNWC are not correlated with sales or costs. Simultaneously, net working capital cycle NWCC is characterised by its positive, statistically significant and moderate correlation with sales and costs (in both cases r = 0.57, p-value = 0.004). Its component IT is correlated with costs (C) (r = 0.76, p-value = 0.000…), while for "CP – S" and "PL – C" pairs correlation does not exist (Figure 4).
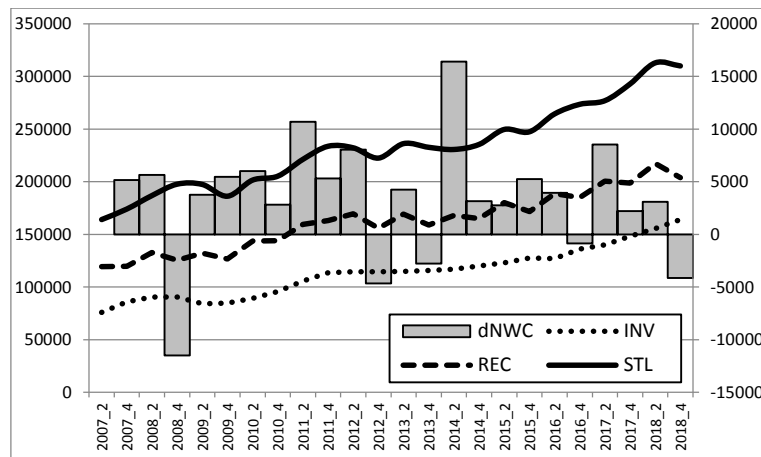
Figure 4. Changes in net working capital (dNWC), inventories (INV), receivables (REC) and short-term liabilities (STL) in manufacturing enterprises in 2007-2018. Note: dNWC – right axis. Source: same as Figure 1.

The effects of NWC management with regard to changes in current assets and short-term liabilities should be correlated with measures related to financial liquidity – current (CR) and quick (QR). Manufacturing enterprises are characterised by a very strong correlation of NWCC and CR ($r = 0.80$, p-value = 0.000…). For "NWCC – QR", correlation is slightly weaker ($r = 0.68$, p-value = 0.000…). The study shows that NWCC components IT and CP are not correlated with current liquidity (CR) ($r = 0.29$; $= 0.26$, p-value = 0.111; $= 0.225$). For "PL – CR", a correlation is moderate and inversely proportional ($r = -0.59$, p-value = 0.002) (Figure 5).
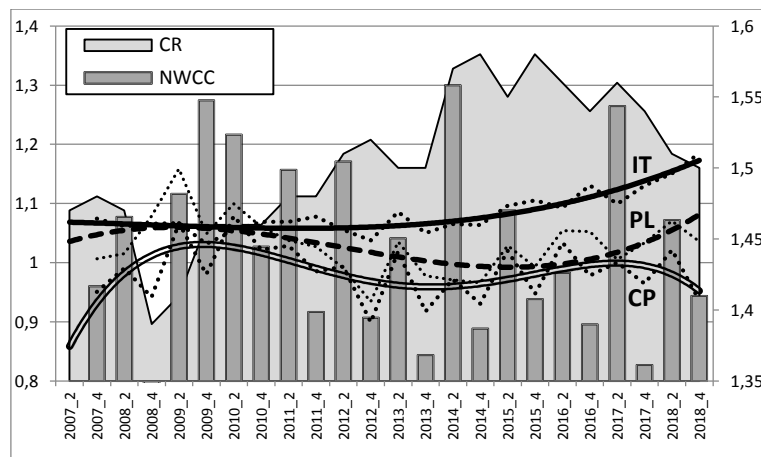

Figure 5. Cycles of inventories (IT), receivables (CP), short-term liabilities (PL), net working capital (NWCC) and current liquidity (CR) in manufacturing enterprises in 2007-2018. Note: CR – right axis. IT, CP, PL, NWCC – pace of changes (initial period=1). Source: same as Figure 1.

NWCC is a cash cycle which determines the time of converting engaged capital to cash. Manufacturing enterprises do not record a statistically significant correlation between NWCC and cash (short-term investments – STI) ($r = 0.36$, p-value = 0.080). However, ¾ of the analysed periods confirm the principle that NWCC changes, from period to period, lead to contrary STI changes, which is clearly visible after 2011.

Correlations between NWCC and the profitability of sales (RRS) are not recorded in manufacturing enterprises (r = 0.07, p-value = 0.975) (Figure 6).
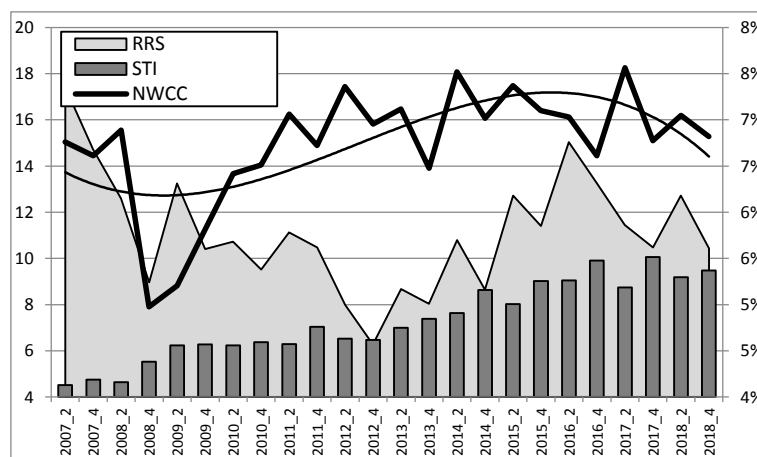

Figure 6. Net working capital cycle (NWCC) and revenue from sales (S), short-term investments (STI) and profitability of sales (RRS) in manufacturing enterprises in 2007-2018. Note: RRS – right axis. STI – dimensionless values. Source: same as Figure 1.

4.3. The profile of manufacturing enterprises in the context of working capital management

The profiling of manufacturing enterprises is based on two criteria – according to their position in 24 divisions of PKD – Polish Classification of Activities, and according to PKD sections by size categories (small, medium and large).

Companies differ considerably from the point of view of PKD divisions with regard to IT, CP and PL components. This concerns the receivables cycle (CP) to the smallest extent, for which the level of diversification is also the lowest (standard deviation 9.6% – time axis). It is followed by the inventories cycle (IT) at 12.1%, while the lowest level is recorded for the receivables cycle (14.0%). The relative spread (maximum–minimum/mean) is also the lowest for CP (1.43), and it is at the level of 2.46 for IT and 2.20 for PL.

The translation of the above conclusions to profile images (as a result of the time–axis compression of 2007–2018 to one–period dimension represented by the mean value) confirms the hypothesis that differences between PKD divisions with regard to the current assets cycle (CAC) result from the inventories cycle (IT) rather than the receivables cycle (CP). Because PL differences are smaller than those for CAC, PKD divisions differ with respect to NWCC due to the former factor. Only a few PKD divisions are characterised by a negative NWCC cycle: (PKD 11) production of beverages, (PKD 12) tobacco products, (PKD 30) production of other transport equipment (Figure 7).
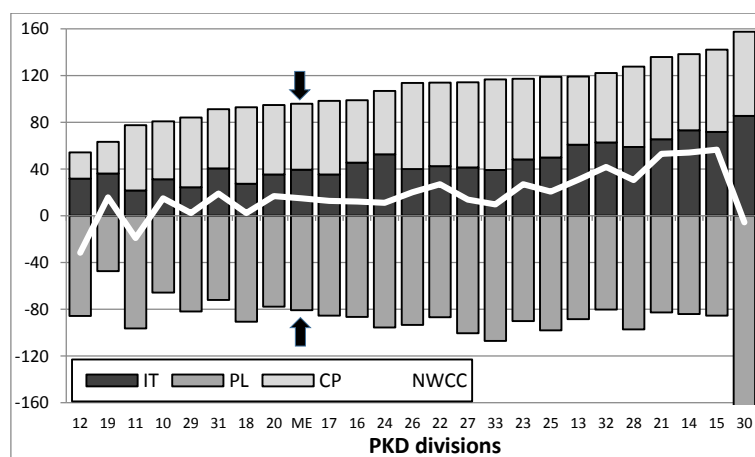
Figure 7. Inventories (IT), receivables (CP), short–term liabilities (STL) and net working capital (NWCC) cycles in manufacturing enterprises according to PKD divisions. Note: time axis (2007-2018) compressed to a one-period dimension represented by the mean value. Arrows indicate mean values for manufacturing enterprises (ME). Source: same as Figure 1.

Profiling according to PKD company size categories is conducted using time–axis compression. Profiles are different, but only slightly. Generally, large companies are characterised by the lowest NWCC values (14.2) and the values of its components – IT (38.0), CP (54.7), PL (78.5). They are followed by medium companies (NWCC – 20.9, IT – 44.1, CP – 62.3, PL – 85.5), and small companies (NWCC – 18.7, IT – 42.0, CP – 67.7, PL – 91.0).

The degree of diversification measured by standard deviation shows the same ordering: small companies (the greatest diversity), medium and large companies (the lowest level of diversity) (Table 1).

An assessment of the similarity of profiles can be based on the initial information on the correlation of curves representing the mean values of NWCC and its components for particular PKD divisions. It shows the lowest similarity for the "small–large" pair of enterprises (the mean value for components 0.64), followed by the "small–medium" pair (0.70). The highest value is recorded for the "medium-large" pair (0.74).

An in-depth analysis based on the TMS similarity measure indicates the lowest similarity for the "small-large" pair (0.916). The "small–medium" pair (0.940) is slightly more similar than the "medium-large" pair (0.932) (Figure 8).

Table 1.
Descriptive statistics of IT, CP and STL in manufacturing enterprises according to size categories (PKD divisions)

No.	Specification	IT	CP	PL
	Small			
1	Mean value	42.0	67.7	91.0
2	Minimum	24.1	29.4	44.7
3	Maximum	81.6	105.4	180.1
4	Standard deviation	12.6	13.7	32.7
5	Standard deviation – minimum for PKD div.	2.4	2.8	3.9
6	Standard deviation – maximum for PKD div.	51.7	75.6	126.2

Cont. table 1.

Medium				
1	Mean value	44.1	62.3	85.5
2	Minimum	25.2	46.9	67.3
3	Maximum	74.9	79.7	166.4
4	Standard deviation	8.5	11.9	20.7
5	Standard deviation – minimum for PKD div.	2.2	2.1	3.2
6	Standard deviation – maximum for PKD div.	23.0	34.6	82.2
Large				
1	Mean value	38.0	54.7	78.5
2	Minimum	17.8	21.5	47.5
3	Maximum	91.3	76.6	158.8
4	Standard deviation	7.3	8.7	16.9
5	Standard deviation – minimum for PKD div.	1.8	2.2	4.3
6	Standard deviation – maximum for PKD div.	16.6	11.4	31.6

Note: cycles of inventories (IT), receivables (CP) and short-term liabilities (PL). Source: same as Figure 1.
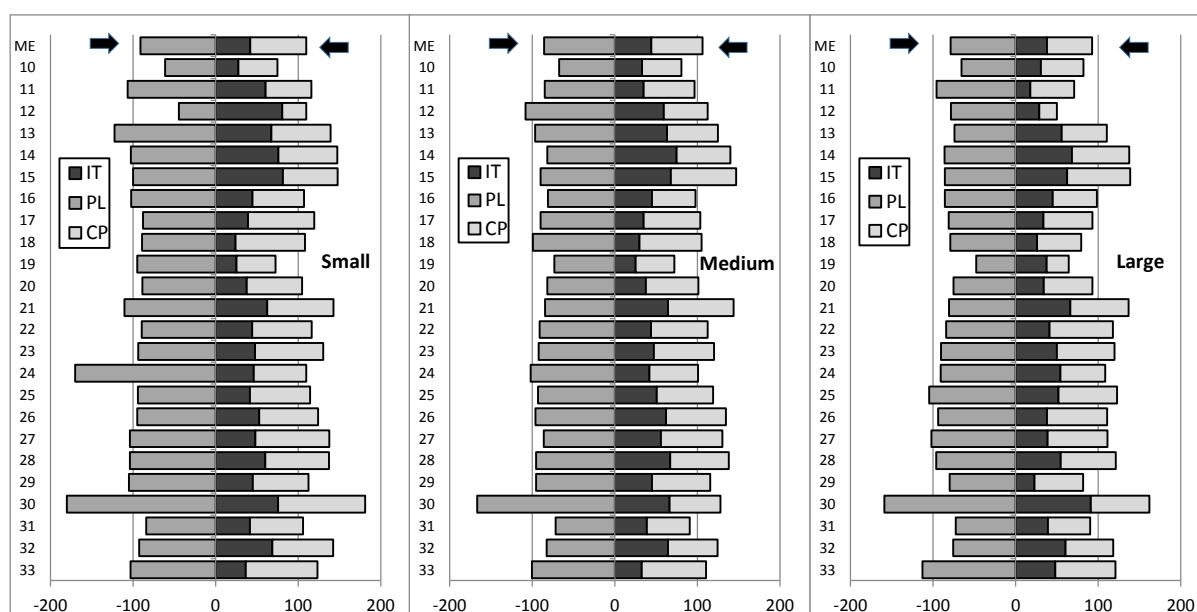

Figure 8. Profiles of manufacturing enterprises with regard to the cycle of inventories (IT), receivables (CP) and short-term liabilities (PL) by size categories and PKD divisions. Note: arrows indicate the mean value for manufacturing enterprises (ME). Source: same as Figure 1.

IT, CP and PL components determine the net working capital cycle (NWCC). Its length shows considerable differences between PKD divisions by size categories, bringing the profiles of small and medium enterprises closer to each other and widening gaps between small and large entities. The assessment of profiles based on TMS leads to the following results – "small-large" (0.533), "small-medium" (0.649), and "medium-large" (0.684).

4.4. Identification of working capital management strategies

The length of NWCC and its components determines the adoption of working capital management strategies, as doing so allows for the ordering and classification of manufacturing enterprises. The first step of the analysis assesses above average CAC and PL values. The mean value is a cutoff point, which also divides objects into uniform subsets (quadrants). Above

average CAC and PL values occur in 53.9% of all enterprises (quadrant 4). It can be assumed that such values correspond to a moderate and relatively less profitable strategy. Below average CAC and PL values are recorded in 16.7% of all enterprises – a moderate strategy with relatively higher profits (quadrant 3). Quadrant 1 corresponds to enterprises (11.4%) with below average CAC and above average PL values (aggressive strategy). Quadrant 2 represents enterprises (18.0%) with contrary characteristics (conservative strategy).

Changes in 2007-2018 relate to a greater dispersion of objects (dispersion measure ZG +51.1%) – gaps between enterprises are widened. The balance of differences (the sum of deviations) with regard to CAC is positive (+7.1% in relation to the base year) but lower for PL (+2.4%), which brings the trend of dispersion closer to the CAC axis (Figure 9).
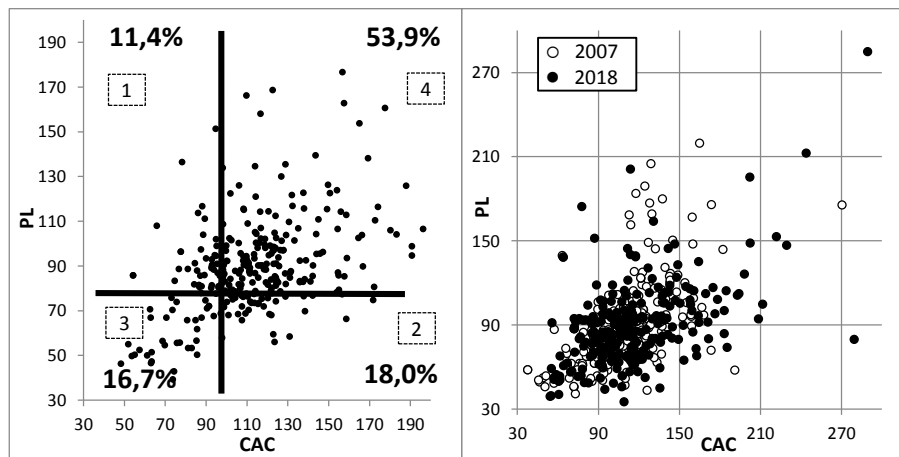

Figure 9. Classification of manufacturing enterprises (left panel) and movements and changes in density (right panel) in 2007–2018 (grouping into PKD classes). Notes: the graphic presentation takes into account the merging into uniform groups by PKD classes – the anonymity of individual data necessitated by statistical confidentiality. Source: same as Figure 1.

The above approach raises doubts as to the merging of two variables (IT and CP) into one CAC criterion. An alternative solution could be offered by measure systems, which, in turn, lead to difficulties in their presentation and application. Hence, the second step of the analysis makes use of a synthetic measure – NWCC (univariate classification with a synthetic measure explained by its 3 components, with attention given to decile distributions).

The conducted test confirms the classification of companies according to NWCC, as well as its components – CAC (IT and CP), and PL. The median (5th decile D5) is used as a cutoff point.

The consistency of the obtained results allows for the identification and classification of enterprises from the perspective of adopted working capital strategies. The adopted criterion is the value of 1st decile (D1) and 9th decile (D9). As a result, the following subsets of enterprises are identified: enterprises adopting an aggressive strategy (NWCC < D1 – 19.9%), conservative strategy (NWCC > D9 – 16.7%), and the dominant subset – moderate strategy (D1 < NWCC < D9 – 63.4%) (Figure 10).
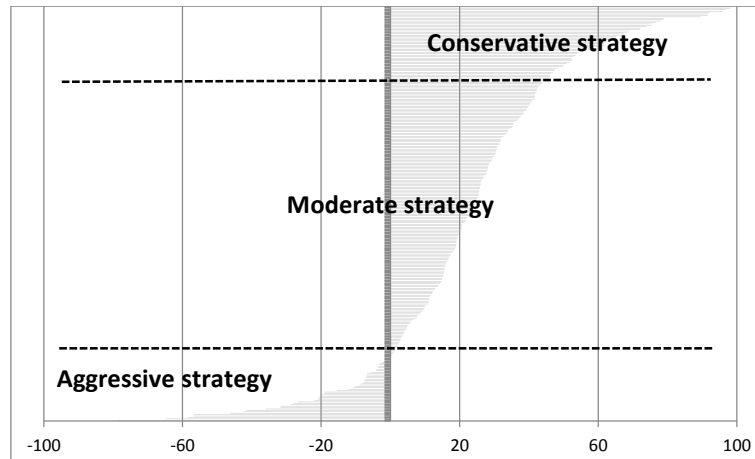
Figure 10. Identification of management strategies in manufacturing enterprises in 2007-2018 in the context of net working capital cycle (NWCC) (grouping into PKD classes). Note: source same as Figure 1.

The analysis of changes in 2007–2018 indicates a slight decrease in the number of enterprises adopting an aggressive strategy – from 29.1% to 28.4%. Simultaneously, a larger number of entities abandon conservative strategies – their share drops from 24.8% to 10.5%. Consequently, a larger percentage of companies resort to moderate strategies – from 46.1% to 61.1%.

The analysis of manufacturing enterprises by size category indicates a similarity between small and medium entities in terms of adopted strategies. Small enterprises, as compared with medium ones, are less inclined to adopt a conservative strategy in favour of aggressive strategies. Simultaneously, the majority of large companies implement aggressive strategies (44.1%), followed by moderate strategies (34.0%), and conservative strategies (22.2%) (Figure 11).
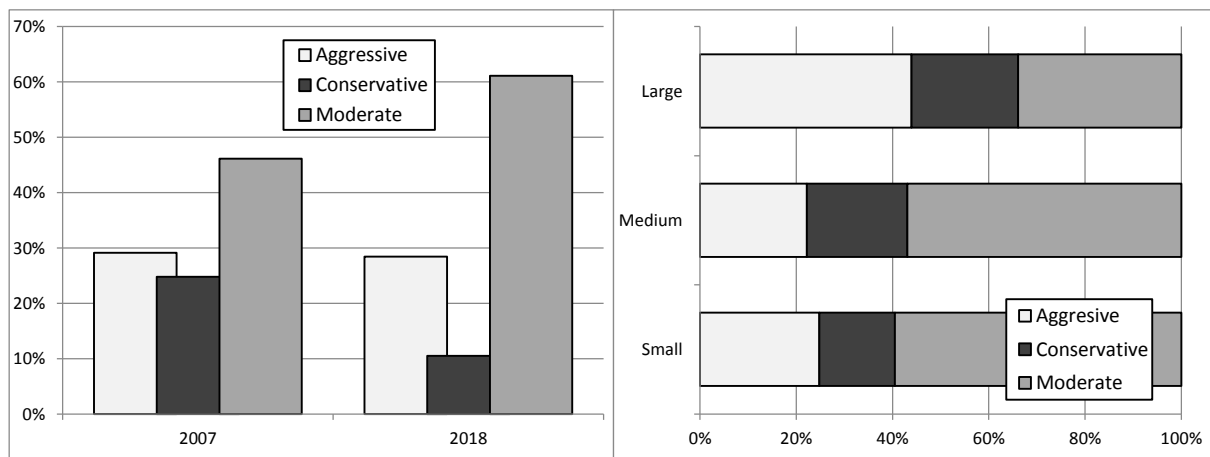

Figure 11. Net working capital strategies in manufacturing enterprises in 2007 and 2018 (left panel), and by size category (right panel). Note: source same as Figure 1.

The third step of the analysis examines correlations between various working capital strategies identified with the use of NWCC and net working capital (NWC), financial liquidity (CR), and the profitability of sales (RRS). These correlations are commonly regarded as

objective phenomena. Manufacturing enterprises (82.7% of cases) are characterised by consistency between aggressive strategies and below average current liquidity (CR), and vice versa – consistency between conservative strategies and above average CR. Consistency between an aggressive strategy and below average NWC (and vice versa) occurs in 47.7% of all the analysed enterprises. On the other hand, consistency between an aggressive strategy and above average RRS (and vice versa) occurs only in 31.0% of all enterprises.

5. Summary

The part of the paper aimed to achieve the first objective – the identification of characteristics and correlations – presents a number of conclusions. Firstly, there is high consistency between the characteristics of the current asset cycle and short–term liabilities, but changes in this area vary in terms of their intensity. Such a situation would imply a more common adoption of the same type of strategy (aggressive/conservative) with regard to both current assets and short–term liabilities. Secondly, there is an increase in the share of companies with high NWCC values (8th decile and 9th decile), which indicates a general trend to abandon aggressive strategies.

Finally, the verification of hypothesis H1 can be referred to the following findings:

a) the length of the net working capital cycle (NWCC) is correlated with liquidity levels – more with (CR) than (QR). This confirms the hypothesis,

b) the length of the net working capital cycle (NWCC) is not correlated with cash (i.e. short–term investments – STI). This implies the rejection of the hypothesis,

c) the length of the net working capital cycle (NWCC) is not correlated with the profitability of revenue from sales (RRS). This implies the rejection of the hypothesis.

With regard to the second objective – a comparative analysis of profiles – enterprises grouped into PKD divisions show considerable NWCC differences. The main differences relate to current assets and their conversion cycles (mainly inventories cycles) rather than short-term liabilities. Assessments based on company size categories indicate the lowest values of NWCC and its components (but also their changeability) for large enterprises. Such a situation, could imply a persistent adoption of aggressive strategies in the analysed period.

Finally, the verification of hypothesis H2 can be referred to the following findings: profiles according to PKD divisions vary in terms of the length of the net working capital cycle and its components – This implies the confirmation of the hypothesis. It should be added that it mainly concerns small and large enterprises.

With regard to the third objective – the identification of working capital strategies – the findings can be considered in two approaches. The first one is the identification of strategies based on the analysis of above average results (the criticised approach). The other approach

(univariate classification with a synthetic measure) confirms the dominance of a moderate strategy despite the use of aggressive strategies in most large enterprises.

Finally, the verification of hypothesis H3 can be referred to the following findings: a moderate strategy prevails in working capital management – this implies the confirmation of the hypothesis. In addition to that, this strategy is implemented in small and medium enterprises.

Further analyses can focus on a wide field of research aimed to identify and assess working capital strategies by size categories and activities (PKD divisions and classes), and to refer the obtained results to similar analyses for trading and service companies. Doing so can lead to creating a comprehensive picture of the status of and changes in implementing working capital strategies in the entire institutional sector, as well as to offering recommendations for improvements and development trends in the implemented solutions (based on questionnaire surveys).

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