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Working Capital Management in Hospitals: Evidence from Poland

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Abstract:

Purpose: *Working capital management is one of the essential elements of financial management. In this paper, we focus on the essence of working capital management in hospitals. The research aims at the analysis of the working capital management in hospitals based on CCC. We also investigate how hospitals finance working capital changes.*
Design/Methodology/Approach: *The research hypotheses are confirmed based on financial data from 77 non-profit hospitals in the period 2015-2018 (with the year 2014 as the basis to calculate the growth). We build panel regression models, using several dependent, explanatory and control variables.*
Findings: *Our results explain the way non-profit hospitals manage their working capital. This process is quite different, compared to commercial (production and service) companies. We show that higher profitability correlates with a longer cash conversion cycle and that operating activities are financing by profit. The observation that the capital structure is irrelevant for the cash conversion cycle strongly supports this conclusion.*
Practical Implications: *This research is fundamental for hospital's managers and other stakeholders.*
Originality/value: *Although research on hospital financial management is relatively numerous, the authors rarely undertake the problem of working capital management. Our study is one of the few in this area.*

Keywords: *Working capital, hospital, financial ratio, hospital's financial management.*

JEL classification: *C51, I15, G32*

Paper Type: *Research study.*

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1. Introduction

Working capital management is one of the essential elements of financial management. Literature shows its vital impact on both maintaining liquidity and profitability (Gavurova, Packova, Misankova, and Smrcka, 2017). In this paper, we focus on the essence of working capital management in hospitals. Primarily, we analyse the relationship between a cash conversion cycle (CCC) and key financial indicators, among all, revenue, profitability, or investment. The notion of working capital refers to the amount of current assets and current liabilities in the company's balance sheet. The net working capital (NWC) means the amount of current assets minus current liabilities. NWC depends on the amount of long-term capital invested in the current assets (i.e., positive net working capital) or amount of current liabilities financing long-term assets (i.e., negative net working capital). As pointed by Shulman and Cox (1985), some elements of current assets and current liabilities are a result of financing activity, while others are a result of its operating activity.

Therefore, they developed two main subcategories of net working capital – working capital requirements (WCR) and net liquid balance (NLB). WCR merges operating elements of current assets and current liabilities (i.e., inventories + accounts receivable - operating current liabilities). NLB combines components of current assets and current liabilities resulting from company financing activity (i.e., cash and marketable securities – short term financial liabilities). Based on the above, we have the following formula:

$NWC = WCR + NLB;$

solving for WCR, we get:

$WCR = NWC - NLB,$ reflecting the sources of financing of working capital requirements.

Working capital management (WCM) aims at lowering the amount of capital invested in the operating activity, and, in terms of operating elements of current assets and current liabilities, it aims at reducing working capital requirements. This goal is achieved by improvements in the company's operating cycle and exploitation of spontaneous sources of financing, however, without much altering the company net sales revenue and costs of goods sold. To observe the company's efforts in reducing working capital requirements, in relation to net sales revenue and costs of goods sold, Richards and Laughlin (1980) develop a popular measure of cash conversion cycle (CCC).

In commercial companies, we can observe a simple relationship, the shorter the CCC is, the more effective is the working capital management. Next, Pogue, Sartoris, and Hill (1983) show theoretically that shorter CCC creates more wealth for company stakeholders. Arcelus and Srinivasan (1993) prove, in the framework of discounted

cash flows, that shorter CCC increases company value. Kieschnick, Laplante, and Moussawi (2013) investigate the empirical relationship between investments in WCR and shareholders' wealth based on the sample of US corporations from 1990 to 2006.

So far, researchers investigate a range of different factors influencing the length of the CCC. Hawawini, Viallet, and Vora (1986), as well as Weinraub and Visscher (1998), Filbeck and Krueger (2005), and Etiennot, Preve, and Allende (2012) find the effect of an industry that significantly moderates the size of investments in WCR. Hill, Kelly, and Highfield (2010) find out that sales growth, the uncertainty of sales, costly external financing, and financial distress determine more aggressive working capital management policies (Michalski, Buleca, Kaminska, Mhemed, and Blendinger, 2017).

Significant sources of internal funding and easy access to the capital market result in more conservative working capital management. Ding, Guariglia, and Knight (2013) show, based on a large sample of Chinese firms, that effective working management alleviates the effects of financing constraints on investments in fix assets. Baños-Caballero, García-Teruel, and Martínez-Solano (2010) point out that size of the company, the age, leverage, investments in fixed assets, and return on assets pursue more aggressive working capital management. In the next study, they investigate the speed of adjustments to target working capital requirements and based on the analysed sample, assign the pace of adjustments to external financial constraints and bargaining power (Baños-Caballero, García-Teruel, and Martínez-Solano, 2013).

2. Working Capital Management in Hospitals

Although in the literature there is relatively extensive research on hospital's financial condition (Cleverley, 1990; Zeller, Stanko, and Cleverley, 1996; Watkins, 2000; Bazzoli *et al.*, 2008; Bazzoli, Fareed, and Waters, 2014; Chen, Bazzoli, and Hsieh, 2009; Bem *et al.*, 2014; 2015), the problem of working capital management rarely attracts researchers' attention. We believe that hospitals are specific enterprises. Our previous research shows several differences in financial management. We also expect that working capital management will also have some specifics so we can identify some abnormal relationships.

First, based on previous studies, we can conclude that generally, in competitive market conditions, hospitals are forced to manage their working capital, exactly like other companies striving to optimise short-term fund balances (Elnicki, 1977; Rój, 2020). Other research suggests that hospitals should put a particular emphasis on WCM, more than just hospital working capital flow (WCF) as a separate area of asset flow (Chu *et al.*, 1991).

Secondly, Elnicki (1977) reports that the level of net working capital, as well as net

current assets, decreases with a hospital's size, expressed as the number of beds (Bem *et al.,* 2014a). He also finds a positive correlation with operational flows, but not with cash flows.

Thirdly, the effective working capital management allows achieving higher profitability (Talha, Christopher, and Kamalavalli, 2010). Many studies show a negative relationship between the level of current assets, kept in quest of seeking for higher liquidity, and hospitals' profitability (Krzeczewski, 2016; Prędkiewicz and Prędkiewicz, 2013a; Prędkiewicz and Prędkiewicz, 2013; Bem *et al.,* 2014b). CCC has a similar impact on financial performance – hospitals that collect payments more effectively, show higher profitability. On the other hand, more profitable hospitals pay their bills faster (Rauscher and Wheeler, 2012).

A hospital, like any other company, is part of the more comprehensive system, which is the sector it operates, or the economy. It remains in close relation with the environment (such as customers or suppliers, owners, or patients). The relationships presented in Figure 1, and therefore the decisions on working capital, can be described in the game theory convention. We can identify here four players who run the game (Siedlecki, 2007). The leading players are NFZ[5], suppliers, patients, and, of course, a hospital itself. According to Polish conditions, operational activities, and, at the same time, the flow of working capital in hospitals differ significantly from patterns observed in commercial enterprises (Figure 1).

Hospital receivables come almost entirely from the NFZ, which is a monopolistic payer in a health system. The level of funding, set by NFZ, limits hospitals' budgets. Receivables from other sources, like insurance companies and individual consumers, are negligible for the point of view of financial processes taking place in hospitals. Generally, a hospital's receivables can be split into two categories:

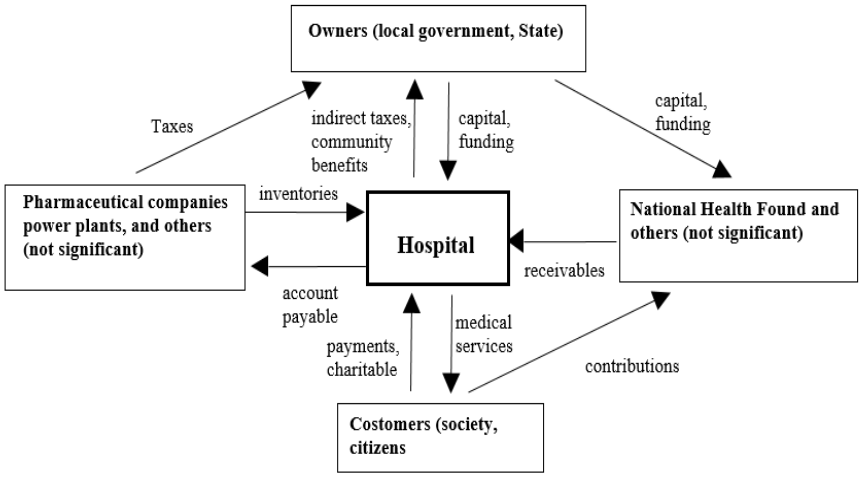
- the revenue coming from planned procedures and lifesaving services - paid regularly,
- the revenue coming from non-life-saving procedures provided above the contract - in this case, it is difficult to determine the date of payment; usually, there are not fully irrecoverable.

The primary sources of trade payables are media suppliers (electricity, gas, water), companies providing drugs and medical supplies, or medical staff employed as an independent entity (company's contracts instead of labour contract). Previous studies underline that inventories in hospitals do not represent a significant part of the working capital. Drugs and other medical equipment are usually delivered almost just-in-time. Nevertheless, they can have some impact on working capital management. So, a hospital orders materials and services from the suppliers, for which it must pay, and creates trade payables. At the same time, it earns money by

[5] *NFZ = National Health Fund – a monopolistic payer in Polish healthcare system*

providing medical procedures (receivables) paid by NFZ, which, in turn, receives compulsory contributions from the employees. Hence, this market game can be analysed in pairs: supplier – hospital, hospital – NFZ, and NFZ – patient.

Figure 1. *Financial flows in hospitals*



Source: *Own study.*

In a pair hospital– supplier, a hospital always loses, while the supplier wins when sales revenue exceeds the costs of raising and maintaining working capital and a tax. The same is true for the pair hospital – NFZ when a loser is NFZ, which receives its winnings from the population. In this example, we deal with a cyclical process, and a balance is achieved only when everyone wins. A cyclic balance occurs when the following dependencies are guaranteed:

$$RevS - OCS - Tax > 0$$

$$RevH - RevS - OCH \geq 0$$

$$RecN - RevH - OCN \geq 0,$$

where:
RevS, RevH - suppliers and hospital revenues, respectively,
RecN –receipts from health contribution (NFZ revenues),
OCS, OCH, OCN – operating costs of the suppliers, hospital, and NFZ respectively,
Tax – tax paid by the suppliers.

When any of the participants in this game has a loss, there is an imbalance, which can consequently lead to financial difficulties. For example, when a hospital does not receive money from the NFZ for provided services, it usually suffers a loss. Hence, it tries to finance this loss by extending payment deadlines or not paying the suppliers. So, the next time the suppliers will try to force purchases at a higher price,

what can cause a hospital's loss.

An introduction of an owner is a short-term solution to this problem, i.e., local authorities and the State, which enables providing financial support for a hospital, or even NFZ. In this case, an owner, from an economic point of view, loses, but, at the same time, wins social benefits generated by a hospital. This situation may, through feedback, cause a deepening of the crisis among players. When we introduce an owner into the game, it produces increased costs for patients or lowered wages for the hospital's employees. It can potentially decrease quality and efficiency. To restore the balance, an owner (local government, the State), or a community, must mobilise additional funds – in the form of capital (owner) or taxes, health contributions (community). That changing imbalance is a source of a hospital's cyclical development.

This process determines the aims of working capital management and indicates the sources of its financing, which allow maintaining the balance. Hospitals should strive to finance changes in working capital using their resources and maintain an appropriate level of CCC.

3. Research Concept

The research aims at the analysis of the working capital management in hospitals based on CCC. We also investigate how hospitals finance working capital changes. In the case of commercial companies, there is usually an assumption that the shorter CCC is preferable - a company operates more effectively. In this case, a company bears lower financial costs from external sources, generated profit, or cash transfers to owners (in the form of dividends or investments that raise the value of the company).

Commercial companies finance their working capital using short-term sources such as factoring, revolving credit, or short-term securities. They can, therefore, shorten a period of receivables inflow. In the case of hospitals, it is generally impossible. Factoring or trade credit is possible to employ only in the case of "private" receivables, but their share in a hospital's revenue is minimal (less than 1% of the receivables). Loans and revolving loans are challenging to mobilise and, according to previous research, cannot constitute a significant source of funding.

Therefore, in the case of hospitals, profits and delayed payments are the best, or rather the most available, way of financing. This mechanism allows avoiding disruption of the system (increased capital gap) caused by delays (or extended payment deadlines) in NFZ payments. Therefore, we can assume that the operating cycle (inventories and receivables) are financed mainly by trade payables, cash, or profits. Based on this assumption, we formulate the following hypotheses:

H1: profitability correlates positively with CCC;

H2: an increase in receivables, as well as losses, are financed by commercial liabilities, which, in turn, impact CCC.

We assume (H1 hypothesis) that public hospitals' owners do not expect from a hospital any financial flows (in the form of dividend or increased company's value). Owners are satisfied with social benefits (like improved access to medical services) or better quality of services. Hence hospitals can use cash or profits to prepone payments and, as a result, increase their creditworthiness.

The H2 hypothesis is based on the observation that hospitals cannot pursue a proper credit policy, so changes in receivables must be financed with commercial liabilities. Hospitals finance an increase in receivables by increased trade liabilities or, if it is possible, profits (cash) (assuming constant DSO). The hospitals, thus, strive to maintain a stable level of CCC. An increase in unplanned receivables, usually paid by NFZ with a delay, if any, hospitals are forced to finance by prolonged payment deadlines. Thus, based on CCC and the analysis of the working capital's source of financing, we can build an indicator signalling an interference in the system.

The hypotheses are reviewed based on financial data from 77 hospitals. Data covers the years 2015-2018 (with the year 2014 as the basis to calculate the growth). We build panel regression models, using the following variables:

- dependent variables: CCC, trade payables increase (ΔAP), trade payables conversion cycle (ΔAPC);
- explanatory variables: an increase in receivables (ΔAR) and inventories (ΔINV), receivable conversion cycle (ARC) and its growth (ΔARC), profitability RCF ((net profit + depreciation)/ sales revenues), cash increase (ΔC), a revenue increase;
- control variables: SIZE - natural logarithm with assets (ln(A)), capital structure - D% (long term debt/total assets).

We estimate the following models with robust HAC:

$$CCC = b\_1 \cdot RCF + control\ variables + time\ dummies$$

$$\Delta CCC = b\_1 \cdot RCF + control\ variables + time\ dummies$$

$$\Delta AP = b\_1 \cdot \Delta AR + b\_2 \cdot \Delta INV + b\_3 \cdot \Delta C + b\_4 \cdot RCF + \Delta Rev + control\ variables + time\ dummies$$

$$\Delta APC = b\_1 \cdot \Delta ARC + b\_2 \cdot \Delta INVC + b\_3 \cdot RCF + control\ variables + time\ dummies$$

To control heteroscedasticity, we use the Breusch-Pagan test. Its results indicate heteroscedasticity in the research sample. Therefore, we estimate the models with Eicker–Huber–White standard errors (robust HAC). This solution allows

constructing models that do contain heteroscedastic residuals. We employ Hausman's test to check model misspecification. In the Hausmann test, the null hypothesis is that the preferred model is a model with random effects, while the alternate hypothesis tells that the model with fixed effects is preferred. The p-value smaller than 0.05 suggests rejecting the null hypothesis.

4. Results and Discussion

The average value of CCC for analysed hospitals is 6.8 days (for all years) (Table 1). A more in-depth analysis of CCC components (inventory cycle, APC, and ARC). We can observe a low level of the inventory cycle. It is, on average, 5.43 with the standard deviation 3.97 with no significant changes between analysed years. Inventory policy has a stable character– stocks, therefore increase in proportion to revenues.

It confirms our initial assumption that inventories do not play an essential role as a part of working capital management, as hospitals usually tend to maintain low levels of stocks. The way drug and medical equipment suppliers operate, and the high competition in this sector, do not force hospitals to accumulate supplies. The average length of the trade payable conversion cycle (APC) is 36.51 days, with the standard deviation of 23.63 days. It is higher than 30 days specified by law regulation. It is accompanied by the long receivables' conversion cycle 37.88 days with a standard deviation of 18.04 days. So, we find a significant fit between APC and ARC.

Thus, the length of CCC proceeds from the inventory conversion cycle, as the APC and ARC are nearly the same. An analysis of the average INVC and CCC indicates there do not significantly differ (p-value 0,3119), which suggests that they are financed from profits. Hospitals, to improve liquidity and efficiency, do not change inventory policies but simply manage commercial liabilities.

***Table 1**. Descriptive statistics for analysed variables*

		2015	2016	2017	2018	All years
Dependent variables						
CCC	Mean	7.652919	6.47368	8.054979	5.050178	6.807939
	Stand. Dev.	19.77141	24.32812	23.02412	26.35787	23.40689
ΔCCC	Mean	-0.78665	-1.17924	1.581299	-3.0048	-0.84735
	Stand. Dev.	17.52244	18.23596	16.99606	16.7775	17.38401
ΔAP	Mean	0.096533	0.174169	0.208638	0.268686	0.187007
	Stand. Dev.	0.328539	0.520633	0.786641	0.8006	0.639978
ΔAPC	Mean	-0.18697	1.218938	0.102681	2.10234	0.809248
	Stand. Dev.	12.63967	15.65114	14.99315	15.14316	14.60975

Explanatory variables						
RCF	Mean	0.063613	0.059466	0.064583	0.042518	0.057545
	Stand. Dev.	0.070296	0.079522	0.072095	0.081515	0.076156
ΔAR	Mean	0.091597	0.117974	0.31824	0.047331	0.143785
	Stand. Dev.	0.546627	0.384514	1.251615	0.279653	0.72702
ΔINV	Mean	1.482567	1.425531	2.832293	1.592585	1.833244
	Stand. Dev.	11.52331	11.5076	16.15252	11.60777	12.80378
ΔRev	Mean	0.061769	0.103067	0.094791	0.069824	0.082363
	Stand. Dev.	0.205873	0.342712	0.187806	0.073225	0.223426
ΔARC	Mean	-1.1805	0.1201	1.487656	-1.14864	-0.18035
	Stand. Dev.	12.70488	10.11464	15.02266	12.54431	12.70104
ΔINVC	Mean	0.206885	-0.0804	0.196324	0.24618	0.142247
	Stand. Dev.	3.369292	2.398833	1.791048	2.345691	2.531406
Control variables						
Ln(Assets)	Mean	3.204285	3.213893	3.274688	3.327311	3.255044
	Stand. Dev.	0.877301	0.922258	0.931145	0.938524	0.914477
D%	Mean	0.28738	0.258437	0.261935	0.263996	0.267937
	Stand. Dev.	0.195468	0.191127	0.193653	0.189033	0.191734
CCC Components						
ARC	Mean	37.336603	38.944359	37.795719	37.456703	37.883346
	Stand. Dev.	16.058896	18.530572	21.044194	16.424670	18.046318
APC	Mean	35.02311	36.34473	38.44707	36.24205	36.51424
	Stand. Dev.	20.98967	24.26739	24.06932	25.33114	23.63557
INVC	Mean	5.339428	5.455351	5.70153	5.259027	5.438834
	Stand. Dev.	3.921989	3.731013	4.748889	3.449677	3.97629

Source: *Own study.*

Table 2 shows the results of the panel regression (with fixed effects or random effects). The models explain the relationship between CCC and profitability (RCF). Based on the Hausman test, we prefer the model with random effects.

***Table 2**. Panel regression models with robust HAC. Dependent variable: CCC*

Variables	Fixed effects (robust HAC)		**Random effects (robust HAC)**	
Const	-0,647671	4,50526	**-0,0838994**	**3,89999**
RCF	121,960***	123,687***	**123,006*** **	**120,972*** **
LnAssets	0,169243		**−0,0274561**	
D%		-16,4259		**−13,7187**
dt_2	-0,675055	−1,14167	**-0,0274561**	**−1,07458**
dt_3	0,271931	−0,135778	**0,271931**	**−0,0642620**
dt_4	- 0,0507351	−0,377580	**−0,00447969**	**−0,371556**
LSDV R-squared	0,741605	0,744131		
Within R-squared	0,093458	0,102322		
Durbin-Watson	1,429518	1,451992	**1,429518**	**1,451992**
Wald H0: No time effects-Chi square	0,312183	0,435622	**0,312183**	**0,424509**
Breusch-Pagan Chi square			**159,914*** **	**159,538*** **
Hausman Chi-square			**0,00416771**	**0,119737**

***Source:** Own study.*

Estimated models show the strong and highly statistically significant (at the level α=0.01) relationship between the length of CCC and profitability (RCF). However, the direction of this dependency differs from patterns observed in commercial companies – hospitals that achieve higher profitability have a longer CCC (Deloof, 2003). Additionally, the hospital's size (measured with the natural logarithm of assets) or capital structure (represented by the debt ratio – D%) does not affect the length of CCC.

In the next step, we analyse factors affecting the changes of CCC by estimating the model with the fixed effects (Table 3). Again, we confirm that the variations in the length of CCC positively correlates with profitability (at the level α=0.01). At the same time, there is no relationship between changes in CCC and the hospital's size, as well as the capital structure. Hence, the elongation of CCC is explained by the growth of profitability.

***Table 3.** Panel regression models with robust HAC. Dependent variable: Δ CCC*

Variables	**Fixed effects with robust HAC**		Random effects with robust HAC	
Const	**−1.48911**	**−9.12299**	−5.40978*	−4.69514*
RCF	**151.737*** **	**152.131*** **	52.8933***	52.7567***
LnAssets	**−2.79313**		0.392731	
D%		**−4.66708**		1.92245
dt_2	**0.263546**	**2.87791**	3.02212	−0.118153
dt_3	**2.41751**	**2.92075**	2.86527	2.36572
dt_4	**1.32645**	**2.58819**	2.69095	−1.06027
LSDV R-squared	**0.246527**		0.246475	
Within R-squared	**0.092619**		0.092557	
Durbin-Watson	**2.137775**	**2.140788**	2.137775	2.140788

Wald H0: No time effects-Chi square	**0.702518**	**0.569462**	1.63358	1.63716
Breusch-Pagan Chi-square			5.67056**	5.70442**
Hausman Chi-square			7.60294**	7.45616**

Source: *Own study.*

Our findings strongly support the hypothesis H1. In both models, all parameters are statistically significant at level 0.01. Those results are somewhat unexpected, as, in commercial companies, better financial situation and higher profitability mean a shorter cash conversion cycle.

Subsequently, we follow with the decomposition of CCC. Tables 4 and 5 present the results of panel models estimation. For both dependent variables (ΔAP and ΔAPC), models with fixed effects are preferred.

Table 4 shows the result of the estimation for ΔAP as the dependent variable. We confirm the positive relationship between the changes in trading payables (ΔAP) and the changes in trading receivables (ΔAR) (statistically significant at the level α=0.01 and α=0.05). Profitability (RCF) correlates negatively with the change of the level of accounts payables (ΔAP) (at the level α=0.05).

Table 4*. Panel regression models with robust HAC. Dependent variable: ΔAP*

Variables	**Fixed effects (robust HAC)**		Random effects (robust HAC)	
Const	**0.214036*** **	**0.135163**	0.0588181	0.0395795
ΔAR	**0.146771****	**0.146312****	0.161686**	0.162101**
ΔINV	**0.0292112**	**0.0283804**	0.0408377	0.0415997
ΔC	**0.00268832**	**0.00196845**	0.0408377	0.00311630
RCF	**−1.94113***	**−1.98457***	0.00320488	0.432148
ΔRev	**0.189976**	**0.196364**	0.317721	0.316532
LnAssets	**0.0316960**		−0.0100692	
D%		**0.289044**		−0.0459940
dt_2	**0.0423200**	**0.0389006**	0.0714478	
dt_3	**0.0264751**	**0.0506371**	0.0672094	
dt_4	**0.0264751**	**0.0307181**	0.108961*	
LSDV R- square	**0.299800**	**0.301143**		
Within R- square	**0.073441**	**0.075218**		
Durbin-Watson	**2.046882**	**2.047266**	2.042267	2.047266
Wald H0: No time effects-Chi square	**0.809554**	**1.08012**	3.33189	2.98977
Breusch-Pagan Chi square			3.62457*	3.60804*
Hausman Chi-square			3.62457***	16.2214**

Source: *Own study.*

Table 5. *Panel regression models with robust HAC. Dependent variable: ΔAPC*

Variables	**Fixed effects (robust HAC)**		Random effects (robust HAC)	
Const	**−33,5732**	**7,55708**	1,26726	3,05480
ΔARC	**0,230236****	**0,249454*****	0,234449**	0,233533**
ΔINVC	**−0,463175**	**−0,343265**	0,131216	0,120750
RCF	**−96,7516****	**−96,6957****	−29,8138***	−31,5400***
LnAssets	**12,4547****		0,215945	
D%		**−4,27109**		−3,42648
dt_2	**0,452468**	**0,458207**	1,01296	0,906887
dt_3	**−1,11262**	**−0,394508**	−0,320815	−0,388791
dt_4	**−1,27312**	**0,155121**	1,62118	1,53164
LSDV R-square	**0,241861**		0,230791	
Within R-square	**0,100674**		0,087542	
Durbin-Watson	**2,155053**	**2,165034**	2,155053	2,165034
Wald H0: No time effects-Chi square	**0,567465**	**0,0939569**	0,75756	0,699936
Breusch-Pagan Chi square			6,74305***	6,726***
Hausman Chi-square			15,7344***	13,9013***

Source: *Own study.*

Hence, the changes in trade payables can be explained by the changes in trade receivables and profitability – when the level of trading payables grows, it is financed from the growth of trading receivables. Additionally, when a hospital reports lower profitability, it negatively affects the change of trading payables. Both a hospital's size and capital structure are statistically insignificant. What is interesting, revenue is also an irrelevant factor.

The changes of the length of trade payables conversion cycle (ΔAPC) positively correlate the changes of trade receivables conversion cycle (ΔARC) (at the level α=0.01 or 0.05), as well as with a hospital's size (Ln Assets) (α=0.05), and negatively with profitability (α=0.05). Hence, hospitals characterised by lower profitability are constrained to prolong the payment dates. Changes in the payable's conversion cycle can be explained with changes in the length of the receivables conversion cycle. When the public payer extends the payments, hospitals are forced to pay the trade debt later. This model also potentially explains the impact of a hospital's investments – when the sum of assets increases, it positively stimulates APC. The above findings confirm the hypothesis H2.

Our findings are consistent with the work of Arunkumar and Ramanan (2013) regarding a positive relationship between profitability and payables conversion cycle. However, it contrasts with the positive relationship between profitability and inventories conversion cycle. It also goes with the findings of Sharma and Kumar (2011), as well as Pinku and Paroma (2018).

5. Conclusions

Our results describe the way Polish hospitals manage their working capital. First, they must depend on the monopolistic public payer, which sets the payments' deadlines. Therefore, hospitals do not have enough autonomy to manage the receivables conversion cycle. To solve this problem hospital effectively manages the receivables conversion cycle by adjusting the length of the payables' conversion cycle to the receivables' conversion cycle. Commercial liabilities finance possible delays in the payments for receivables. As a result, the length of the cash conversion cycle spring from the inventory conversion cycle.

Unlike commercial companies, where previous studies showed an inverse relationship between profitability and the cash conversion cycle, in Polish hospitals, this dependency is positive (Białek-Jaworska, Faff, and Zięba, 2020). Higher profitability correlates with a longer cash conversion cycle. This finding requires further research, but initially, we assume that those hospitals pay their obligations faster, as they do not have other opportunities for short term investments.

Our results also suggest that hospitals' operational activity is finance with profits and commercial liabilities. The proportion of these sources is the result of a hospital's profitability. The observation that the capital structure is irrelevant for the cash conversion cycle strongly supports this conclusion.

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