IMPACT OF HOSPITAL'S PROFITABILITY ON STRUCTURE OF ITS LIABILITIES

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Abstract. *We have analysed the relationship between hospitals' profitability ratios and debt. We have used data covering financial information from 333 hospitals (V4 group). The data was obtained from Amadeus-database. Methods used: ANOVA, t-Student test. We have found that contrary to the pecking order theory hospitals with low profitability show smaller use of debt in financing, which can limit access to both equity and debt capital.*

Keywords: *pecking order theory; hospitals; finance, debt.*

Introduction

Hospitals play an extremely important role in the health care system, as they provide health services of the highest level of specialization. Hospital activity is thus of the utmost importance for local communities. Hospitals, especially public hospitals, often fulfil additional social tasks, going far beyond the provision of health services. It is important, because most of hospitals in the V4 Group are public entities, the main goal of which is not only generating profit, but providing equal access to health benefits as well. However, this is not possible, if the hospital's financial condition is poor, because, as a result of existing budgetary constraints, such a situation does not allow to continue the operating activity, or leads to reduction of the quality of benefits. It creates the need to maintain profitability, at the level sufficient to continue basic activities – the investments are mostly financed from the state budget or the budgets of local authorities. Notwithstanding the specifics mentioned above, hospitals are usually rated with the same tools as other companies. Profitability and debt are still the basic indicators of hospital financial health assessment.

Hospitals in V4 countries

Health system in the countries of the V4 Group (the Czech Republic, Hungary, Poland, Slovakia) are organized on the basis of the universal health insurance. In all the analysed countries the dominant source of funding comes from public resources - primarily in the case of the inpatient care. Public participation

in the financing of hospital care is extremely high - from 87.6 % (Hungary) to 96.9% (the Czech Republic). In the hospital sector, public ownership dominates (regardless of the legal form of the activity) (Table 1). Private hospitals are relatively few and they usually focus on selected benefits only, so they often achieve better financial results. Public hospitals, often owned by local authorities, must ensure a wide access to health benefits. As a result, public hospitals are forced to provide also benefits, which are under-funded by payers (Gavurová et al., 2014; Michalski, 2010).

Expenditures on inpatient care are, basically, at the same level, with the exception of the Czech Republic, where they seem to be significantly higher, which may be associated with a higher rate of inpatient care admission/discharges per 100 population. The number of hospitals is essentially similar – except for Hungary, where it is lower; however, taking into account a large number of beds, it suggests, that Hungarian hospitals are significantly larger than those in other countries. Funding mechanisms are also similar – the money generally comes from contracts negotiated directly between hospitals and payers (health insurance institutions). Hospital activities, in the case of public entities, are often subsidised by public authorities. As for the investment funds, they mostly come from local authorities or governmental grants (Table 1). These similarities allow to consider hospitals from the V4 Group as a homogeneous research group.

Table 1. Comparison of selected health system characteristics (V4 Group) (based on HOPE European Hospital and Healthcare Federation Data)

	CZ	HUN	PL	SL
Expenditure on inpatient care per capita (PPP$)	640,2	454,6	464,8	402,9
Public inpatient expenditure as % of total inpatient expenditure	96,90%	87,90%	94,70%	95,10%
Hospitals per 100.000 population	2,43	1,73	2,51	2,56
Hospital beds per 100.000 population	683,55	718,18	654,84	597,54
Public inpatient beds as % of total inpatient beds	85,78%	96,87%	73,15%	-
Inpatient care admission/discharges per 100 population	20,48%	20,42%	16,15%	18,46%
Hospital financing	The major part of budgets are covered by health insurance, as well as by the state, regional and local authorities which contribute to hospital budgets	Contracts with the national health insurance administration	Contracts negotiated directly with hospitals, the state budget funds, tertiary healthcare funds	Contracts negotiated with the national health insurance administration
Hospital investments	Investments are funded by the state budget and by local authority budgets	Investments are funded by the state budget and by local authority budgets	Investments are mostly funded by local authorities or state budget	The state budget (The Ministry of Health)
CZ – Czech Republic; HUN – Hungary; PL – Poland; SL - Slovakia				

Our previous studies have shown, that the profitability of hospitals (especially public ones) is low or very low (Prędkiewicz, Prędkiewicz & Węgrzyn, 2014; Bem et al., 2014a; Bem et al., 2014b; Bem, Ucieklak-Jeż & Prędkiewicz, 2014; Prędkiewicz et al., 2014; Hajdikova, Komarkova & Pirozek, 2014), Bem & Michalski, 2014; Michalski, 2010). This observation generally involves all countries of the V4 Group.

The relationship between profitability and debt

Hospitals usually incur debt for two reasons. The first one is the need for financing of small investment (e.g., equipment). The second is related to the necessity of financing current activities, which is associated with the need to maintain financial liquidity. Regardless of the motives, it is important to study the relationship between profitability and debt of the hospitals.

The literature provides a wide variety of evidence concerning the relationship between profitability and debt, but generally they come from the sector of commercial enterprises and refer to the capital structure theory. The relationship between debt and profitability may be explained by two theories – the pecking-order theory and the trade-off theory (Cole, 2013).

The trade-off theory suggests that the more profitable a company is, the less liabilities it uses to finance operational activities. At the same time, corporate bodies want to take advantage of the tax benefits associated with the cost of debt. The trade-off theory focuses on taxes and bankruptcy costs. In accordance with this assumption, the company defines the level of debt, which minimizes the cost of company's capital and maximizes its value. The company strives to maintain the optimal value of the debt indicators that maximize the profitability of the company. As a result, it implies a positive relationship between profitability and debt. Several studies confirmed the existence of such dependence, especially for large companies (Shyam-Sunder & Myers, 1999; Frank & Goyal, 2003).

According to the pecking-order theory, financing comes from three sources: i.e. internal funds, debt and new equity. The most preferred source are retained profits. In the case, when such funding is not possible, which can be associated with a poor financial situation, the enterprise is forced to seek an external capital, mostly in the form of loans and credits. The new equity it considered as the last resort. Companies prefer debt than the new equity (Shen, 2014).

Companies that are more profitable, are generally more conservative on the issue of debt acquisition, which suggests a negative relationship between profitability and debt (Frank & Goyal, 2009; Michalski, 2015). Many studies confirmed this assumption (Jõeveer, 2005; Tong & Green, 2005; Charalambakis & Psychoyios, 2012; Psillaki & Daskalakis, 2009; Chen & Strange, 2005). The study on Polish enterprises also showed a negative relationship between profitability and debt. Mazur (2007) confirmed that companies having high profitability and high liquidity, prefer internal funds. Rajan and Zingales (1995) confirmed the negative correlation between profitability and debt. In the short term, if the debt is the dominant form of financing, it reduces the company's profitability. They demonstrated, that the relationships were stronger with the increasing size of the company. Rajan and Zingales also claimed, that the companies which are profitable and, on the other hand, have relatively little investment's capacity, may have the more positive relationship between profitability and the level of debt. Titman and Wessels (1988) also investigated the relationship between profitability and debt and proved a strong negative relationship. They found, that the company's profitability from the previous periods affect the volume of retained profits. The availability of retained earnings is, therefore, an important determinant of the current capital structure (Szczygiel et al., 2015; Šoltés & Gavurová, 2014). On the other hand, Philosophov and Philosophov (1999) stated, that there were no connections, linear or non-linear, between debt and profitability.

According to these analysed relationships, the literature provides very limited and mixed evidence regarding the relationship. Some research confirmed that high profitability might decrease the level of debt ratios (Chung, Seung Na & Smith, 2013). Wedig et al. (1988) suggested, that hospitals characterised by lower profitability, have higher levels of financial leverage, due to lower profits. Valvona and Sloan (1988) proved, that private hospitals use financial leverage to a greater extent than public hospitals, and are generally levered more than other fields of industry (Michalski, 2014; Raisova et al., 2014).

Other research proved, that hospitals, which were more exposed to bankruptcy are less prone to take on debt. Collapsing hospitals usually limit the debt, in order to be more attractive to potential investors (Landry & Landry, 2009) – which would suggest a positive relationship between the analysed values. At the same time, Langland-Orban et al. (1996) also showed that hospitals with higher profitability had

lower debt ratios, which implies a negative relationship. Vogel (et al., 1993) also confirmed a negative link between the low level of debt and the extraordinary profitability. On the other hand, part of the research did not confirm, the relationship between debt and profitability (Ngorsuraches & Sornlertlumvanich, 2006).

Research concept

The aim of the research was to analyse the relationship between profitability and structure of capital in hospitals in the V4 group. We assumed that the pecking-order-theory can be used to describe hospital financial management. As in Titman and Wessel (1988) research we assumed that higher use of debt is the consequence of low long-term profitability because hospitals prefer retained earnings rather than bank loans. On the other hand, losses or low profits lead to demand for external capital. On that basis we set our hypothesis:

H1: *Hospitals with lower profitability level use bank loans on a larger scale when compared to the more profitable ones.*

The research sample includes financial data from 333 hospitals coming from countries of the V4 group (the Czech Republic, Hungary, Poland and Slovakia). The data comes from Amadeus database. We have used statistical methods, first of all, the Student t-test and ANOVA. We have used GRETL package and Microsoft Excel.

Methodology and data

In order to prove this hypothesis, we created the database, consisting of financial data from 333 hospitals. Hospitals were collected by hand, to ensure the homogeneity of the sample. Financial data for the year 2013 have been obtained from the Amadeus Database.

Initially, we investigated 416 medical entities from the Czech Republic, Hungary, Poland and Slovakia. Some of the observations were removed due to lack of all the required data. Entities, for which providing hospital services were not a primary activity, were also excluded. We decided to investigate only hospitals meeting the criterion of having an admission room, and at least 2 hospital wards, in order to exclude hospitals providing mainly "one day" surgical procedures, due to its special financial character. We also removed small entities, with total assets and operating turnover below 1 mln EUR.

The research sample included: 94 Czech hospitals (36,7% of hospitals in the Czech Republic), 10 Hungarian hospitals (5,8% of hospitals in Hungary),212 Polish hospitals (21,9% of hospitals in Poland), and 17 Slovak hospitals (12,1% of hospitals in Slovakia). Selected hospitals were both private and public, and operated in different legal forms. The sample included also teaching hospitals. We qualified into this study both public hospitals (owned by the government or local authorities or with a public majority shareholding) and private hospitals, regardless of the legal form of the activity. We removed outliners by removing top and bottom 5% values for each indicator.

In order to measure the level of profitability, we decided to use several indicators:

- mEBIT (operating margin), described by the formula: (Revenue – Cost of Goods Sold – Operating Expenses)/Operating Turnover;
- ROA(b) (return on assets before taxes), described by the formula: profit before taxes/total assets.

The level of profitability was calculated for the year 2013 and, as the average value for 2011-2013 (3 years) and 2009-2013 (5 years) ,in order to include short and long term profitability.

The level of debt has been measured with the use of the following debt indicators:

- Loan Debt Ratio (Assets ratio), described by formula: ([(long term debt + short-term loans) / total assets].
- Loan to Turnover Debt Ratio (Turnover ratio), described by formula: ([(long term debt + short-term loans) / Operating Turnover].

We decide to use the second debt indicator in reference to our Polish experience. Public hospitals in Poland often do not have property rights for their real estate (land plots and buildings). Buildings are often owned by local governments or other local authorities and hospitals use them without property

rights. Another problem related to the assessment of Polish hospital debt is that public hospitals cannot go bankrupt, effectively. Their debts are usually guaranteed by local or central authorities, if the ownership is strictly public. Consequently, there are cases of hospitals which keep on their medical activity having debts greater than their total assets. Debt ratio measured by dividing loans by operating turnover may nullify the effect of lower fixed assets.

The differences among means (average values) were tested using t-Student test and ANOVA. The statistical significance of differences were tested using the F-test. The analysis was carried out using GRETL software and Microsoft Excel.

Results

During the first step of our research we divided the whole sample into dichotomy groups characterized by profitability indicator greater and lesser (or equal) than 0. Then we used a more precise split into profitability quintiles.

The analysis based on dichotomy groups with ROA(b) either greater or lesser than 0, did not give any significant results. Average debt ratio (assets based) was ca. 9,5-9,8% for hospitals with losses and 10,7-11,1% for the profitable ones, but the difference was not statistically significant (p-values above 30%). Similar outcomes were obtained in the case of debt ratio based on operating turnover - still statistically insignificant, except for the 3-year-average (see Table 1).

Table 1. Hospital debt ratio by profitability - ROA

Profitable	Assets ratio			Turnover ratio		
	ROA2013	ROA3Y	ROA5Y	ROA2013	ROA3Y	ROA5Y
Yes	11,06%	11,09%	10,74%	12,02%	12,65%	12,04%
No	9,77%	9,48%	9,72%	9,69%	8,45%	9,03%
Average	10,4%	10,4%	10,4%	10,9%	10,9%	10,9%
p-value	48,57%	33,14%	54,11%	32,64%	4,49%	15,42%

First results showed, however, that hospital behaviour could be inconsistent with the pecking order theory. Results of the EBIT margin (m EBIT) analysis were much more meaningful (see Table 2). The difference of the margin EBIT among hospitals with operating loss and those with operating profits were still statistically significant. Hospitals which are unprofitable at the EBIT level, were less prone to use debt as source of financing. This tendency proved to be stronger than at gross profit/loss ratio level.

Table 2. Hospital debt ratio by profitability – EBIT margin

Profitable	Assets ratio			Turnover ratio		
	mEBIT2013	mEBIT3Y	mEBIT5Y	mEBIT2013	mEBIT3Y	mEBIT5Y
Yes	11,81%	12,28%	11,96%	12,33%	13,48%	13,43%
No	7,26%	7,36%	7,84%	7,60%	6,39%	6,81%
Average	10,4%	10,4%	10,4%	10,9%	10,9%	10,9%
p-value	1,04%	0,31%	1,36%	3,67%	0,07%	0,17%

We have found, that in all cases hospitals characterised by the lack of operational profitability used the debt to a lesser extent, regardless of the relation of the debt to assets or turnover. Those hospitals were financed with loans at the level about 33% lower than profitable ones. In this case the differences were statistically significant for all analysed ratios.

During the next step we grouped hospitals into profitability quintiles. Based on ANOVA analysis, we have proved that, contrary to the pecking-order-theory, highly profitable hospitals were characterised by higher loan debt ratio, regardless the relationship of the debt to assets or to turnover. These relationships were, however weak, in the case of profitability measured with ROA indicator (see Table 3).

Table 3. Hospital debt ratio by profitability quintiles - ROA

Profitability quintile	Assets ratio			Turnover ratio		
	ROA2013	ROA3Y	ROA5Y	ROA2013	ROA3Y	ROA5Y
1	8,09%	9,30%	10,42%	8,88%	6,63%	8,97%
2	8,10%	9,54%	9,32%	7,43%	9,76%	8,14%
3	12,23%	9,56%	6,76%	10,70%	9,53%	7,43%
4	11,17%	12,14%	14,85%	15,71%	15,43%	19,18%
5	12,09%	11,33%	10,86%	11,67%	11,94%	10,48%
Average	10,4%	10,4%	10,4%	10,9%	10,9%	10,9%
p-value	23,68%	75,93%	2,3%	9,67%	12,05%	0,08%

Hospitals having high return on assets were characterised by high level of debt (4-th and 5-th quintile) regardless of applied ratio-methodology (assets or turnover). At the same time, hospitals with lower ROA (1st and 2nd quintile) showed much lower level of loans.

This tendency - highest debt ratios for 4th quintile, instead of in 5th- could be explained by high interest paid by the most indebted entities, which finally lowered their overall profitability. Generally, we have shown that profitable hospitals were more heavily in debt, which could also mean that there was a strong trend not to use debt as a primary source of financing in the case of less profitable entities and the opposite tendency for profitable ones.

It could be magnified by the fact that hospital finance with debt must pay interest, which lowers their profits. We can also assume, that hospitals using debt as a source of financing should have profit high enough to remain in the upper quintile of profitability. This situation should also lead to stronger disparity, if the analyses of debt ratio were based on operating margin quintiles. As we originally expected, the results have been clearer if profitability were measured using EBIT margin (see Table 4).

Table 4. Hospital debt ratio by profitability quintiles – EBIT margin

Profitability quintile	Assets ratio			Turnover ratio		
	mEBIT2013	mEBIT3Y	mEBIT5Y	mEBIT2013	mEBIT3Y	mEBIT5Y
1	7,58%	7,89%	9,85%	7,91%	6,71%	9,39%
2	7,03%	6,95%	6,49%	6,56%	6,14%	4,99%
3	10,6%	9,77%	8,21%	8,17%	8,98%	7,09%
4	12,17%	13,07%	13,43%	13,31%	12,49%	14,05%
5	17,72%	14,23%	14,76%	19,07%	19,45%	20,15%
Average	10,4%	10,4%	10,4%	10,9%	10,9%	10,9%
p-value	1,29%	1,62%	0,31%	0,03%	0,01%	<0,01%

In almost all analyses presented in this research, we have found a clear pattern - the most profitable hospitals had the highest debt ratios, while the least profitable entities used debt on a smaller scale. The only exception from this rule were hospitals with high long-term-losses measured at the ROA level. We have assumed, that it was the result of high interest related to loans. On the other hand, hospitals characterised by high profitability at EBIT level, may borrow funds with high interest, which significantly lowered their gross profit. Consequently, those hospitals fell into lower ROA quintile. It has also suggested us, that hospital managers probably used financial leverage only, when they achieved high EBIT margin, multiplying return on equity ratio.

Conclusions

All presented results have contradicted the pecking order theory, which assumes, that retained profit is first to be used as a source of financing, especially in comparison to debt and new equity. As a consequence, less profitable entities, which cannot earn any profits, should start using external source of capital, like debt, earlier and on a larger scale than those having their own funds (see also: Michalski, 2008). Our research has proved quite the opposite behaviour. We suppose, that it can be the effect of

inability to apply successfully for bank credit in the case of profitless hospitals. Banks are not prone to grant loan to entities which constantly report losses, unless they are guaranteed by public authorities.

We surmise that the need for capital must be fulfilled in other ways – in a form of owners' grants or subsidies, capital contributions or the EU funds. Furthermore, the unmet demand for capital is dangerous for further existence of any hospital with lower profits. They don't have a sufficient access to bank credit and can't create equity capital through retained profits. From the point of view of growing needs for investment, related to increasing quality of healthcare services, it could lead to potential problems with patients' safety and satisfaction. It could also lead to a dangerous situation, where profitable hospitals have both sufficient amount of equity and debt, while the other entities have neither enough equity capital nor access to debt. Such a situation can be, nowadays, observed in Poland, where most public hospitals report losses and, on the other hand, there is a small group of profitable entities, which have excess funds. It leads to financial problems of the first group and inefficiency of hospitals from the second group.

Our previous studies (Bem et al., 2014) have shown, that there is a big polarization between hospitals, in terms of liquidity. We suggest, that government should make incentives, introducing some kind of cash-pooling or internal bonds system, which could lead to granting access to debt for less profitable hospitals and the ability to generate extra profits for entities with cash excess. Another solution, which could be implemented, is a regulation, ensuring access to debt for less profitable hospitals, in the form of guaranties from specialized capital funds. Access to finance could be achieved by consolidation of hospital sector. The process of merging hospitals with different profitability could lead to more equal access to debt and internal financing.

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Appendices

Descriptive statistics of the hospital sample

	CZ	HU	PL	SK	total
	Loan ratio assets				
Min	0,0%	0,0%	0,0%	0,0%	0,0%
Max	47,9%	41,4%	47,2%	29,7%	47,9%
Mean	9,1%	14,7%	11,5%	4,9%	10,3%
St. deviation	10,46%	14,91%	12,83%	9,28%	12,03%
	p-value 8,52%				
	Loan ratio turnover				
Min	0,0%	0,0%	0,0%	0,0%	0,0%
Max	68,8%	22,2%	78,9%	41,9%	47,9%
Mean	10,0%	9,51%	12,12%	5,22%	10,3%
St. deviation	13,53%	8,19%	16,74%	10,99%	12,03%
	p-value 31,85%				