

The effectiveness of horizontally integrated hospitals in the Czech Republic

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Abstract — In the Czech Republic, hospital costs are close to half of the total health care costs. This ratio is quite high compared to other V4 countries. It is therefore essential to concern ourselves with whether these expenses are spent effectively. Regarding the fact that in recent years hospitals continue to unite into various holdings, it is desirable to look into whether this form of horizontal integration leads to the desired effect, that is, to lowering expenses, raising effectiveness and to higher quality health care. This article is focussed on the effectiveness of two chosen holdings and it will analyse 6 indicators before and after integration.

Keywords— Effectiveness, holding, hospital, integration, trend analysis.

I. INTRODUCTION

THE concept of effectiveness is, in practise, a specialist discussion and likewise even in publications it abnormally has many meanings. Due to this, we are concerned with effectiveness as a system of various factors:

- effectiveness with a neutral meaning,
- effectiveness as expediency,
- effectiveness as efficiency,
- effectiveness as profitability,
- economic efficiency,
- total effectiveness,
- prosperity.

There are some important definitions:

Effectiveness - producing the result that was wanted or intended.

Efficacious - producing the result that was intended, especially when dealing with an illness or a problem.

Effective – something that is effective produces the intended results.

Effectively – you use effectively to indicate that what you are saying is a reasonable summary of a situation, although it is not precisely accurate.

Efficient – something or someone that is efficient does a job successfully, without wasting time or energy.

Cost-effective – effective in terms of expenses spent, because in planning future financial investments, management focuses on such expenses so as to attain the highest possible investment return, i.e. so as investment is most effective.

Cost-efficiency – efficiency of expenses, or lowering the cost of planned use of resources: for example merging two

companies lowers or cancels certain overheads and achieves efficient expense use. [20]

Among basic indicators which are used to evaluate the effectiveness of healthcare, and also for comparing the level of healthcare in a certain country, are particular indicators concerning demographic parameters, indicators concerning the health of the citizens, indicators for providing health services, indicators of the health system and also expenses on public health.

a) Indicators concerning demographic parameters:

- the age structure and the ageing index which the EU measures as the number of people in post-productive age (65 years old and more) and also 100 children aged 0 to 14,
- the birth rate expressed as an indicator of fertility, the so-called average number of live births for each woman during her reproductive age,
- the mean value of longevity, and the rate of how this value rises,
- the value and development of infant deaths.

b) Indicators concerning the health of the population, which includes two types of information:

Information relating to health, gained from a selective survey:

- subjective perceptions of health according to age,
- chronic illness - focussed on chosen illnesses, for example diabetes, hypertension, rheumatism, asthma and allergies,
- long-term limited activity of the population expressed as subjective perception,
- temporary limited activity of the population expressed, for example, as the number of missed work days, the number of days spent in bed, i.e. the number of days when whatever general activity was limited,
- indicators of hospitalisation expressed as a percentage of hospitalised patients in the last 12 months, the number of nights a year per person hospitalised (and the year), and the number of nights a person is hospitalised (and the year),
- indicators showing outpatient care expressed as a percentage of people who visited a General Practitioner, and the percentage of people who visited a dentist,
- indicators of preventative care focussed on treatment concerning cardiovascular illnesses, also of cancerous illnesses (mostly of women) and toward general infectious illnesses (the flu),
- subjective satisfaction with healthcare,

- aspects of lifestyle – indicators of obesity and being overweight: alcoholism – consumption of alcohol in litres per person per year, smoking as a percentage of regular and casual smokers.

Information concerning health which is gained from routine statistics:

- the average age of mothers and a comparison of live births according to the age of the mother,
- the number of Caesarean section births per 1 000 live births,
- the number of aborted pregnancies per 1 000 live births,
- vaccinations against serious illnesses,
- the number of HIV cases per 100 000 citizens,
- the number of people with sexually transmitted diseases per 100 000 citizens,
- the number of Tuberculosis cases per 100 000 citizens,
- the standard death rate for malignant tumours per 100 000 citizens,
- newly reported malignant tumours as the number of cases per 100 000 people,
- the number of hospitalised people for respiratory diseases and behavioural abuse per 100 000 citizens,
- the commonest causes of hospitalisation.

c) Indicators expressing health services provided:

- the number of doctors per 100 000 citizens,
- the number of dentists per 100 000 citizens,
- the number of hospital beds per 100 000 citizens,
- the use of hospital beds.

d) Indicators of the health system and expenses on healthcare:

- Gross Domestic Product per capita in purchasing power parity,
- expenses on public health per capita, in purchasing power parity,
- the budget share on public health as a percentage of Gross Domestic Product,
- the structure of hospitals according to the owner. [46]

Evaluating the effectiveness of health care is very problematic. The difficulty of evaluations is particularly difficult because no country is satisfied with the situation of their public health system. They are always introducing reforms and are passing new laws and regulations by which effective, quality and safe health care is available.

The second factor of evaluating difficulty is that there are various methods to measure each factor of healthcare and there is some subjectivity in measuring various indicators. Despite these problems, it is important to analyse the current situation and to compare healthcare in individual countries, which will be the basic presumption for improving healthcare. [46]

The aim of this article is to present the effectiveness of horizontal integration of hospitals in the Czech Republic from the viewpoint of analysing various chosen indicators. For judging the effectiveness, three financial and three non-financial indicators were chosen, which are examined in Part III.

Our paper is structured as follows. Part two provides a brief literature overview and part three describes data, methodology

and research results. Part four contains our conclusions and possibilities for future research.

II. THEORETICAL PART

Performance of health care systems and health organizations is currently a very hot topic, which is in the focus of both developing and developed countries. According to Tučková, Fialová and Strouhal [43] the health care system is the part of the social system involving measures, institutions, organizations and activities that aim to treat and prevent diseases, and to strengthen health of the society. It is a summary of a formalized effort, commitment, institutions, personnel and economic resources and research activities, by which the society focuses on the issue of illness, premature death, disability, prevention, rehabilitation and other problems connected with the health status of the population.

Greene [40] estimated the efficiency of national health care systems in 191 countries from an international perspective. The first technique to measure efficiency was developed by Farrell [41] when researching methods of evaluating efficiency of for-profit corporations in the U.S.A.

Hospitals are one of the main organizations in the health service system. It has special importance in health economics, and imposes higher costs on the health system than other health system components [1, 2]. Hospitals are the main consumer of resources in the health sector. Improving their efficiency is the main way to decrease hospital costs [3].

Hospital efficiency has attracted much research in recent decades e.g. Barbeta, Prior, Parkin, Rosko, Steinmann, Staat [6-11]. For instance, Henke et al. assess the cost efficiency of German hospitals by comparing the average case cost of hospitals in different cities [12]. Swart et al. derive a ranking for 50 hospitals according to their length of stay [13]. Parkin and Hollingsworth examine the efficiency of a sample of acute care hospitals in Scotland through analyzing production relationships. [14] Linna & Hekkinen [38] analyzed the efficiency of Finnish hospitals, and Magnussen [39] analyzed Norwegian hospitals.

An analysis of Czech hospital efficiency has so far only been done by Dlouhý et al. [42]

A. Integration of the hospitals

We can observe the trend of integration in the hospital industry and also in services in that industry. In the USA, the number of hospital integrations has dramatically increased in the past 20 years [28, 29]. Integration in the USA typically refers to either horizontal integration of hospitals and physicians, or vertical integration of hospitals and physicians [30]. A similar trend has occurred in the Czech Republic during the past decades. When focusing on horizontal integration, two primary benefits can be seen: (1) increased market power and (2) greater efficiency [28, 31]

A number of foreign authors describe the benefits and risks of integration, e.g. Bazzoli, Baker, Clement, Lake, and Ackerman. [30-34]. The above authors state the following positive points for integration:

- Access to better resources due to collective purchasing

- Greater negotiating power
- Cost reduction and improvement of medical technology through greater information exchange
- Elimination of duplicating various services
- Ability to provide complex services
- Ability to share risks among multiple organizations
- Improved relationships with customers
- Improved quality of health care

On the other hand, several authors such as Halverson [35] or Zuckerman [36] state the disadvantages of integration. Among other points they list the following:

- New costs are incurred from inter-organizational cooperation
- There is loss of autonomy and control

B. Performance of the hospitals

Every enterprise, even hospitals, needs to see how effective they are. According to Wagner, performance can be characterized as a concept which describes the manner in which a certain subject performs a duty, on the basis of comparing the examined and referenced phenomenon from the viewpoint of a pre-determined criterial scale. We operate with a pre-determined aim, which we try to approach. Wagner distinguishes two dimensions of performance:

a) Do the correct things – concerns performance in terms of choosing which duties to undertake. We see this as effectiveness.

b) Do things correctly – concerns performance in terms of efficient methods carrying out chosen duties. We see this as efficiency. [17]

The organization provides medical services which are usually assessed through indicators of costs, revenues and profits. Although these indicators usually appear in comparative statistics, the evaluation according to profit is very problematic for several reasons:

a) Most commercial enterprises stop using profit as a key indicator of the economic situation. Cash-flow indicators and a comparison between revenues and expenditures have become more significant.

b) Profit can be expressed in various forms, such as net profit, profit before tax, earning before interest and taxes, earnings before interest, tax and depreciation [49]

c) To assess profit of hospitals it is also important to determine their legal form of business. Non-profit hospitals functioning as endowments are not primarily based to generate profit and their objective is a balanced economy. In case of economic loss, non-profit hospitals are usually supported from other funds; therefore the economic situation may be biased.

d) In assessing the economic situation of hospitals an issue may come to the fore which is a question of ethics. Healthcare organizations can get into a difficult situation due to the fact that certain services are provided for free. On the other hand, there is a question of whether it is ethical to withhold this service from someone who needs it and whose life depends on this service. [45]

According to Shaw, performance must be defined in relation to explicit goals that reflect the values of various stakeholders

such as patients, professionals, insurers and regulators. This means that measurement systems focus on health outcomes valued by customers. Hospital performance is defined according to the achievement of specified targets, either clinical or administrative. Ultimately, the goal of health care is better health, but there are many intermediate targets concerning processes. Targets may relate to traditional hospital functions – such as diagnosis, treatment, health care and rehabilitation – as well as teaching and research [18, 19].

Otrusina and Pastuzskova present 3 principles of public institution performance = "3Es" – Economy, Efficiency and Effectiveness. They express the basic principles of performance by using the following mathematical equations:

- Effectiveness = objectives
- Economy = objectives + minimum input
- Efficiency = objectives + minimum input + maximum output [20].

By Wen-Bao Lin's research [4E], performance and market orientation has also been widely recognized as closely related. This study investigates factors affecting a hospital's adoption of market orientation and the difference between public and private hospitals in Taiwan in their market orientation after implementation of the National Health Insurance program. Organisational performance refers to the hospital's healthcare quality, profitability, revenue, and financial performance in the last three years. Compared with the profitability of the last three years, the hospital has made a significant improvement this year. Compared with the financial performance of the last three years, the hospital has made a significant improvement in financial performance this year.

C. Efficiency and effectiveness of the hospitals

Efficiency is a term widely used in economics, commonly referring to the best use of resources in production. Hollingsworth and Peacock describe two types of efficiency in health and health care: technical efficiency and allocated efficiency [21]. Technical efficiency means reducing the employment of excess inputs. Allocated efficiency means selecting inputs that incur minimum costs [22].

Vaňková and Vrabková focus on measuring the efficiency of hospitals, see Figure 1. This model works with financial or non-financial parameters or with a combination of the two [25, 26, and 27]. People such as Mandl, Diery, and Ilzkovitz [24] deal with issues of hospital bed care efficiency measurement and evaluation.

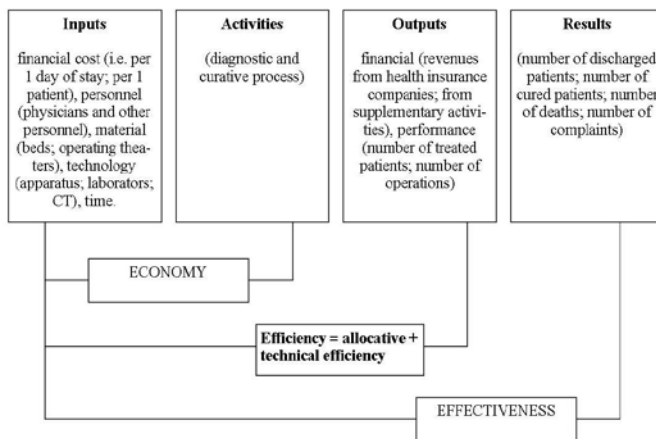


Fig. 1 The process-oriented Hospital Bed Care efficiency measuring Model [23]

Several mathematical techniques are usually considered to assess hospital efficiency and productivity – either parametric or non-parametric [4]. Non-parametric methods such as data envelopment analysis are the most popular [5].

Historically, the most common approach to measuring efficiency is collecting and analyzing descriptive statistics. This involves analyzing input and output such as full-time equivalents, beds, discharges, and operating expenses and then comparing these statistics of previous years to those of the current year or more-recent year. If a hospital's total discharges have increased over time at a greater rate than the rate of staff size increase and spending, then this could mean the hospital's efficiency might have been improved. [16]

In general, descriptive statistics are limited to measuring efficiency over a period of time. The fact that descriptive statistics alone do not account for many other factors that may confound their use as an efficiency indicator can be quite troubling. The most common confounder is variation of mixtures, which makes it difficult to compare the efficiency of one organization with that of another organization that uses only descriptive statistics. [16]

Much of the current research investigating single input or output variables uses regression analysis, or stochastic frontier analysis [15].

Effectiveness is defined as producing the result that was wanted or intended. There are a lot of concepts and approaches to measuring effectiveness in hospitals, for example:

- BSC - concept Balanced Scorecard (BSC) directs to critical areas of measuring effectiveness – financial perspective, customer perspective, internal processes, learning and growth. BSC is a popular method for creating links between operational activities and strategic objectives set by the company. The method is used in particular with regard to effectiveness measurement.
- ABC/M - is comprised of two components: Activity-Based Costing (ABC) and Activity-Based Management (ABM). ABC is not a financial accounting system, but an approach that provides a more effective way to view and interpret information by measuring the cost and performance of business processes and their outputs. ABM is the active

use of ABC information to help organizations perform their missions more efficiently while improving the quality and delivery of products and services.

- EFQM - The European Foundation Quality Model (EFQM) Excellence Model is a non-prescriptive framework based on nine criteria. Five of these are Enablers and four are Results. The Enabler criteria cover what an organization does. The Results criteria cover what an organization achieves. Results are caused by Enablers and feedbacks from Results help to improve Enablers [48].
- DEA – Data Envelopment Analysis is a linear programming based technique for measuring the relative performance of organisational units where the presence of multiple inputs and outputs makes comparisons difficult.
- Benchmarking - Benchmarking is a market-based learning process by which a firm seeks to identify best practices that produce superior results in other firms and to replicate these to enhance its own competitive advantage [47]. Over time, the primary focus of benchmarking has moved from the content of the product or services produced, the strategy pursued, and performance outcomes achieved by top-performing firms to a process focus on the capabilities believed to have produced the superior performance outcomes observed.
- EVA - Economic Value Added is a measure of performance that is purported to better align managers' incentives to that of the shareholders. Accordingly, firms that experience higher agency conflicts should be more inclined to use this performance evaluation system [50].

III. ANALYSIS

There were 166 hospitals in the Czech Republic in 2013. This number includes holdings and other types of vertically integrated hospitals. The first holding – the health industry holding of the Královéhradecký region was founded in 2004 and contained four hospitals. Until now, a total of five holdings or other integrations have been created:

- Health holding of the Královéhradecký region (founded in 2004) – contains five hospitals.
- Hospitals of the Ústecký region (founded September 1, 2007) – contains five hospitals.
- Hospital holding of the Středočeský region (founded September 18, 2009) – contains five hospitals.
- Health holding of the Plzeň region (founded June 30, 2010) – contains six hospitals.
- Hospitals of the Pardubický region (founded January 1, 2015) – contains five hospitals.

Only two holdings were selected for further research – the Středočeský region hospital holding and the Plzeň region health holding. There is economic and non-economic information before and after integration only for these two hospitals. The remaining integrated health care holdings were excluded from research for the following reasons:

- The health holding of Královéhradecký region was founded more than 10 years ago and it is not possible to gain annual reports before and after integration

- The hospitals of the Ústecký region were founded by joining individual hospitals into one single unit which is organized into a single budget for all the hospitals. Is it not possible to analyze changes in each hospital before and after the integration
- The hospitals of the Pardubický region were founded this year and there can be no evaluation after integration.

For analysis, annual reports were used from each hospital from 2004 to 2013. Part of the annual reports included economic and also non-economic results which often needed to be included in order to complete various values in each annual report.

The research was conducted at the Faculty of Management and Economics, Tomas Bata University in Zlín, and the aim was to find answers to the following research question: Does the networking of regional hospitals lead to improving hospital performance?

We will analyze selected indicators of selected hospitals. The following indicators were chosen – three of which are financial and the other three are non-financial. These can be utilized to evaluate performance. These indicators are:

a) *Economic indicators*

- Economic outcome
- Current ratio
- Return on Assets

b) *Non-economic indicators*

- Average duration of stay
- Bed Usage in days
- Average bed occupancy per physician

Indicators were analyzed from 2004 to 2013. A linear trend was used for evaluation by using a coefficient correlation and a t-test for statistical significance.

A. *The health holding of the Plzeň region*

1) *Economic outcome*

Figure 2 shows the average economic results of all hospitals in the holding of the Plzeň region. At the significance level of 0.10, the statistically significant linear trend increases in time. For the significance level of 0.05, this linear trend is not significant. This model can be used to describe and predict how the time series behaves for the significance level of 0.062 or less.

It is also important to mention that average economic results are in financial loss. It is though positive that this trend has a tendency to increase.

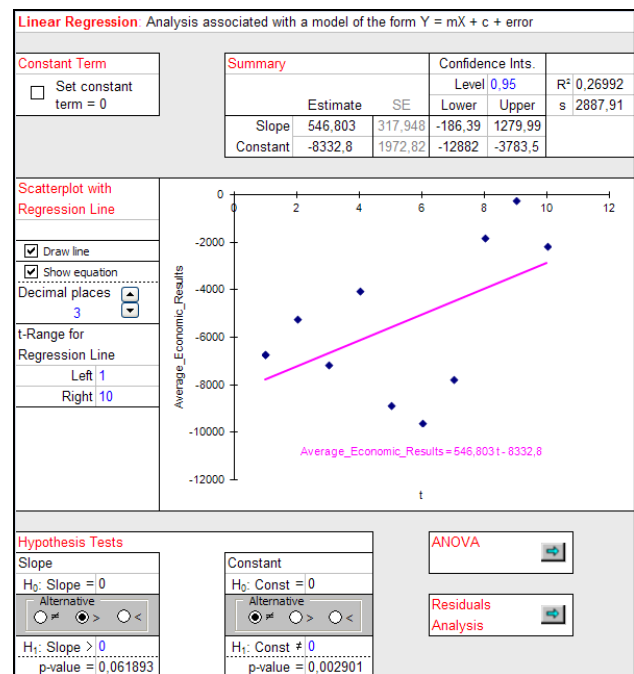


Fig. 2 Linear trend estimate for economic outcomes in the Plzeň Region (own work)

2) *Current Ratio*

For all hospitals in the Plzeň holding, it was proven that the average current ratio at the significance level of 0.10 and also at the significance level of 0.05, increased in time for the statistically significant linear trend – see Figure 3. This model can be used to describe and predict the behavior of the time series for significance levels of 0.001 or less.

We recommend the range for general liquidity is between 1.8 and 2.5. We can see that the average for hospitals fluctuates within this range. Situations whereby values fall below the value of 1.0 would be problematic. This would mean that hospitals weren't able to cover the costs of their short-term obligations from circular activities, but rather from their long-term activities. Here for example, this means from the sale of possessions. This situation though is not indicated in the hospitals of the Plzeň region.

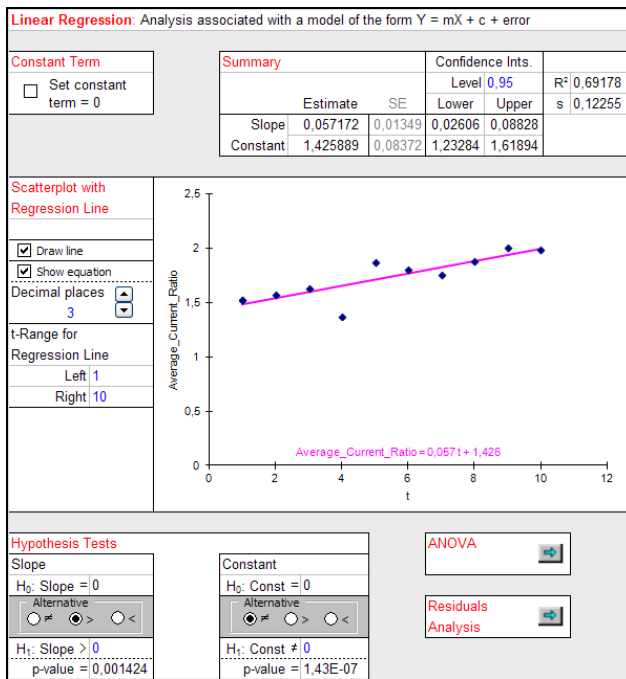


Fig. 3 Linear trend estimate for current ratio in the Plzeň Region (own work)

3) Return on Assets

The Plzeň regional hospital did not display growing trends in the ROA indicator for return on assets, or in other words, the production strength in relation to profit when all assets were invested into business. Therefore, the hospital is not capable of increasing the value of invested capital. The development of the ROA from years 2004 to 2013 is seen in the following graph. This economic indicator did not show a positive trend, see Figure 4.

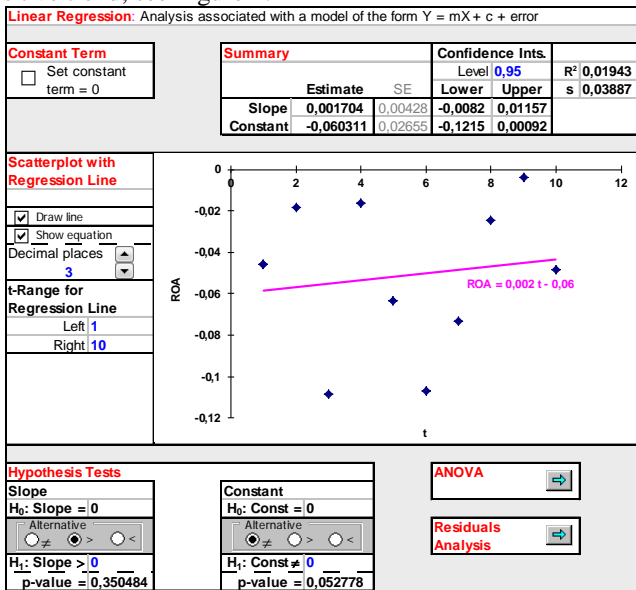


Fig. 4 Linear trend estimate for ROA in the Plzeň Region (own work)

4) Average duration of stay

This indicator of the average treatment time has developed in a positive direction in the last number of years. The result is a decrease in the average period from 37.6 days in 2004 to 16.7 days in 2013. This means a lowering of bed stays of 21 days and also a lowering on patient expenses. This trend is

positive as long as results are compared with the Czech average, which was 6.8 days in 2013. We can say that this holding has achieved an overall better result. These values however, are influenced by two basic subjects that fall into this holding, which are the hospital after-care, where the treatment time is significantly longer than at other hospitals.

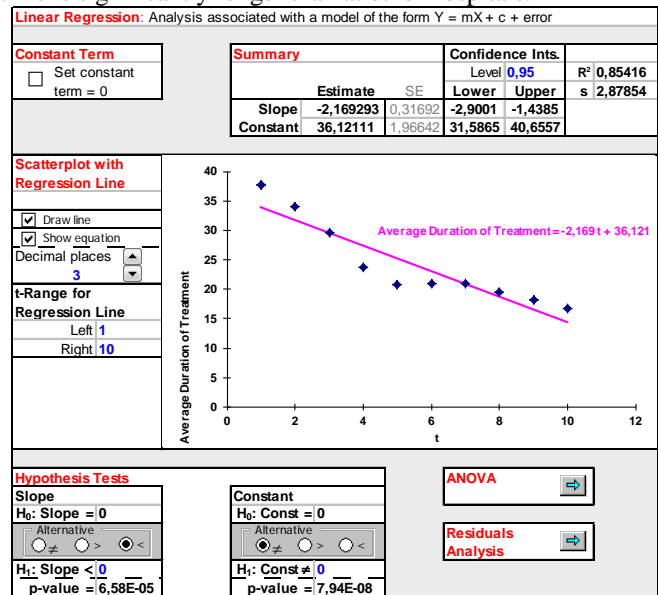


Fig. 5 Linear trend estimate for average duration of stay in the Plzeň Region (own work)

5) Bed usage in days

This indicator introduces how many days in a year a bed is occupied. The average occupancy in 2004 was 307 days, which is 84% of total capacity. In 2013 it was later 265 days, which is 72.6%. This indicator did not confirm a decreasing trend. It is however essential, to take this indicator in context with the previous indicator which indicates the average treatment time. It is clear that the shorter the treatment time, the lower average hospital bed usage rate because there is a longer idle time between releasing one patient accepting the next patient. Refer to Figure 6.

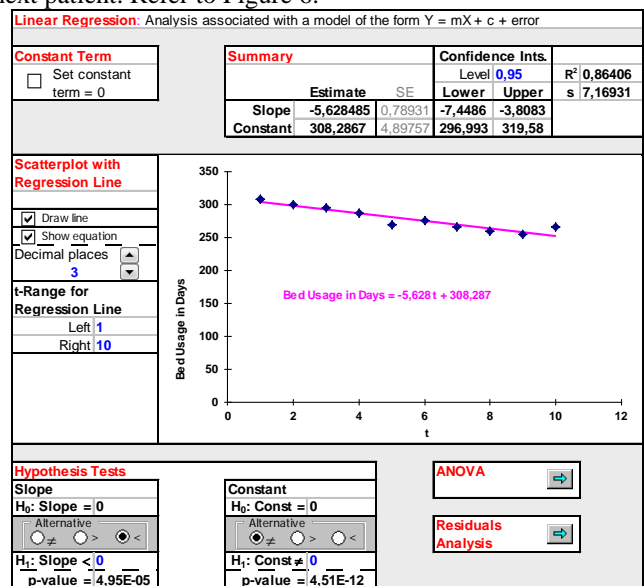


Fig. 6 Linear trend estimate for bed usage in days in the Plzeň Region (own work)

6) Average bed occupancy per physician

This is concerned with trends in the number of beds per doctor. It is clear that this number is decreasing, and the question remains whether this trend is in order. In terms of effectiveness, it seems to be worsening. In terms of quality healthcare, it should be desirable that doctors have fewer patients so that each patient receives more attention. These two trends are in conflict, but considering that this article discusses effectiveness, the trend in the Plzeň regional hospital is negative. The entire development is shown in Figure 7.

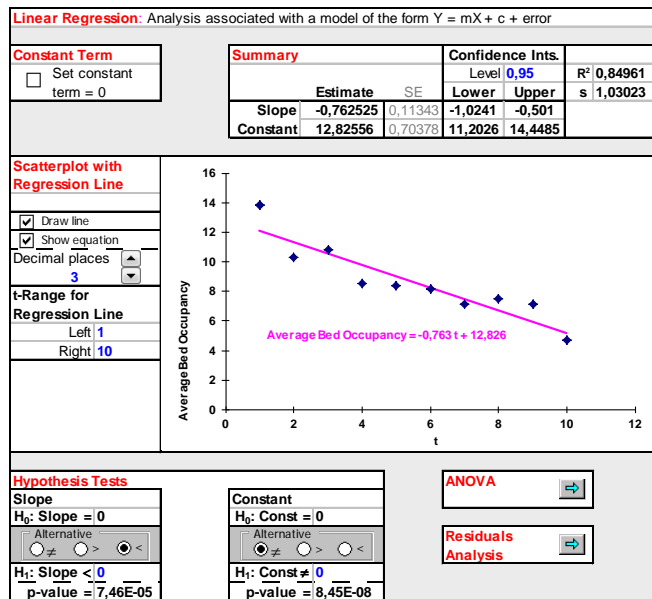


Fig. 7 Linear trend estimate for average bed occupancy per physician in the Plzeň Region (own work)

B. The hospital holding in the Středočeský region

1) Economic outcome

As shown in Figure 8, the average economic result for all hospitals in the holding of the Středočeský region cannot be shown in a linear trend in time, neither for a significance level of 0.05 nor for a significance level of 0.10. This model cannot be used to describe and predict behavior over time, which is probably caused by the outlying observation in the fourth year (i.e. 2007).

The average economic result for the entire holding fluctuates in the negative and the whole trend was not proven as increasing. Here, the effect of integration on increasing economic results was not proven.

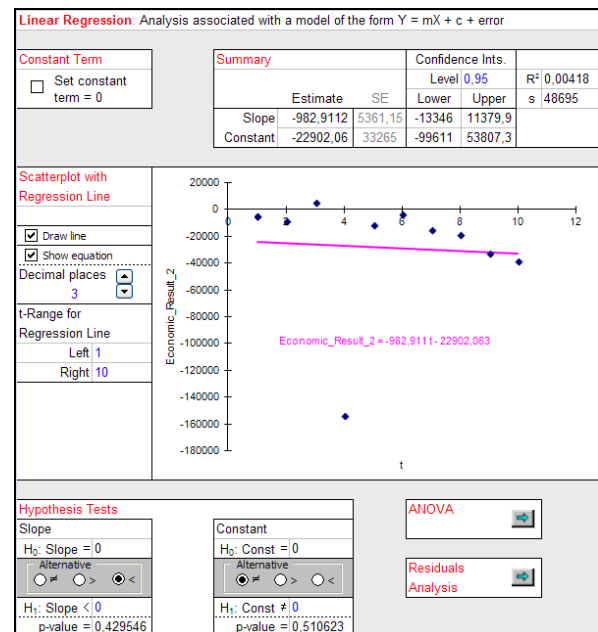


Fig. 8 Linear trend estimate for economic outcome in the Středočeský region (own work)

2) Current Ratio

Concerning the average current ratio for hospitals in the holding of the Středočeský region, a statistically significant linear trend in time was not proven, not even for a significance level of 0.10 – see Figure 9. This model can be used for describing and predicting behavior over time. It is mainly caused by two distant amounts in observation numbers 2 and 8 (i.e. 2005 and 2011).

Concerning particular values, the average values do not fluctuate in the recommended ranges. The values are below the recommended value of 1.8, which is an unfavorable situation for hospitals and they are not capable of recouping their short-term commitments from their circular activities.

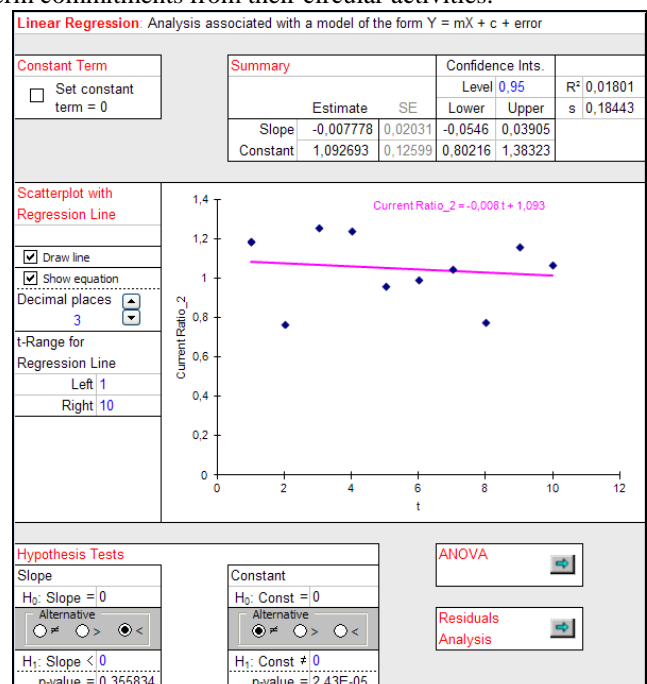


Fig. 9 Linear trend estimate for current ratio in the Středočeský region (own work)

3) Return on Assets

Return on assets is one of the basic proportional indicators. It is expressed from the perspective of the rate of return on assets, or in other words, what part of profit was generated from investing capital. In the case of the Středočeský regional hospital, the ROA did not show an increasing trend. Therefore, this hospital was not capable of increasing the value of the capital invested into it. The development of the ROA from 2004 to 2013 is seen in the following graph, and it can be said that it is in agreement, i.e. that both for hospital holdings there was no apparent increasing trend.

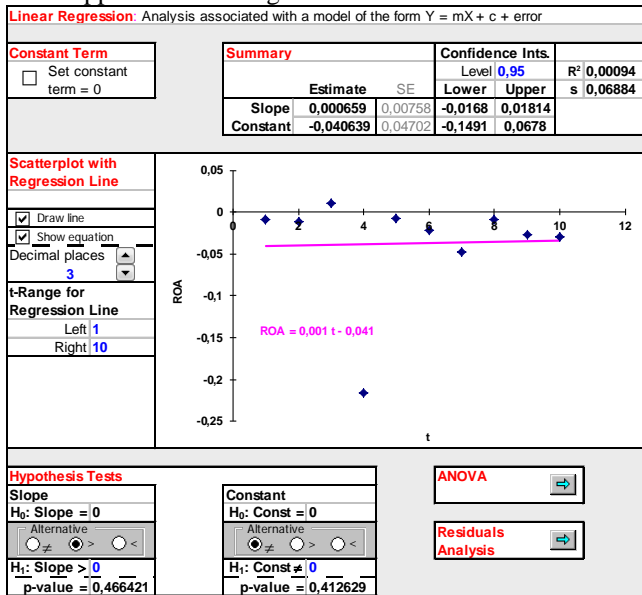


Fig. 10 Linear trend estimate for ROA in the Středočeský region (own work)

4) Average duration of stay

The average treatment time in 2004 was 5 days, and in 2013 it decreased to 3.2 days. In other words, it decreased almost by 2 days. Moreover, this value is below the Czech national average. In this hospital holding, a decreasing trend was confirmed, which is seen in Figure 11.

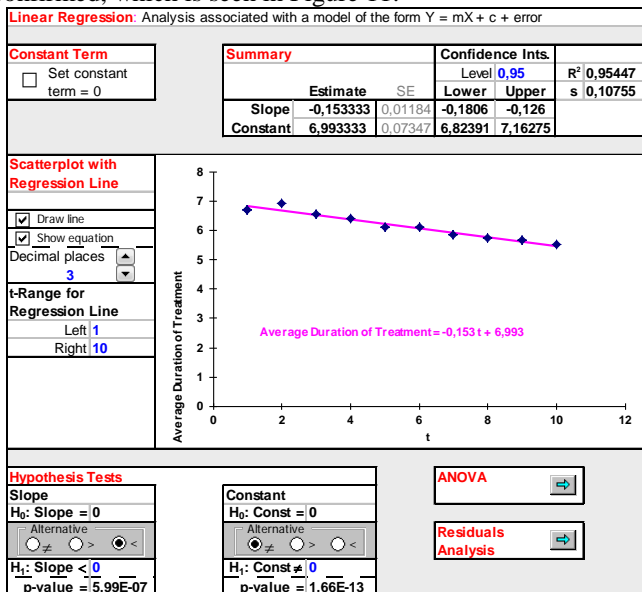


Fig. 11 Linear trend estimate for average duration of stay in the Středočeský region (own work)

5) Bed usage in days

It is essential to evaluate information in a broader context, that is shown in the indicator of the number of days that beds are used. In this case, a decreasing trend was confirmed, which relates to a decrease also in the average treatment time.

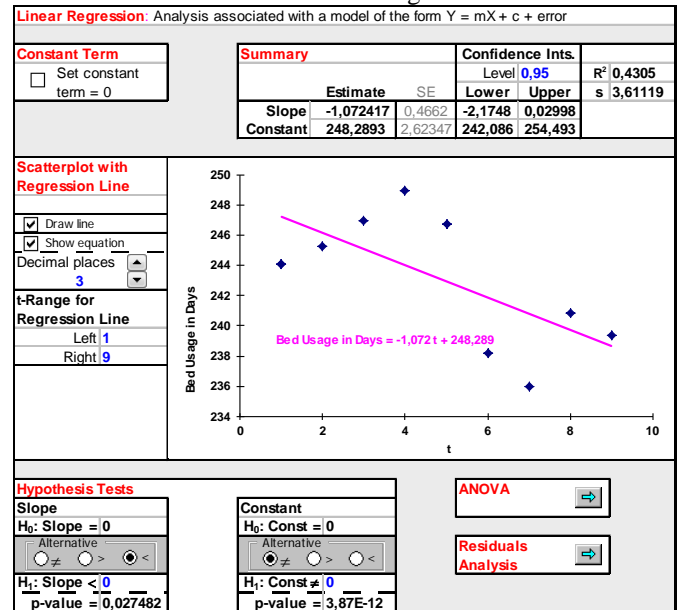


Fig. 12 Linear trend estimate for bed usage in days in the Středočeský region (own work)

6) Average bed occupancy per physician

Indicators of the average occupancy of beds per doctor are in the range of 3 to 7 beds. In the case of the Středočeského regional hospital a decrease can be seen and it can be said that in the following 10 years the value was halved. Therefore, doctors are responsible for less patients than they were 10 years before. From the viewpoint of effectiveness, this indicator can be assessed as negative. From the viewpoint of quality healthcare, it can be said that the trend is positive and that doctors can give quality care because they have less patients to look after. The entire trend can be seen in Figure 13.

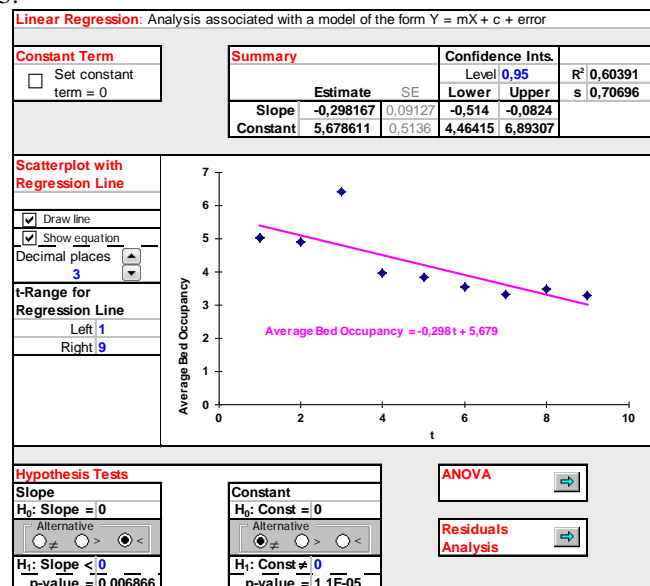


Fig. 13 Linear trend estimate for average bed occupancy in days in the Středočeský region (own work)

IV. CONCLUSION

This research done at the Faculty of Management and Economics was focussed on both financial and non-financial indicators concerning the effectiveness of medical apparatus in the years from 2004 to 2013. This research adds to the research results gained by Walston, Kimberly and Burns [37] which proves that vertical integration of healthcare apparatus brings the following benefits:

- Lowering costs and eliminating unneeded services
- Economics of scale
- Increased market and negotiating power
- Profit and market share gains
- Better recruitment and retention
- Environmental acceptance

The research shown in this article also confirms the benefits of horizontal integration – see Table 1.

In the first Health Holding of Plzeň Regional Hospital it was confirmed that there was a significant benefit of about 0.05 in 4 out of 6 chosen indicators of effectiveness, and a significant benefit of 0.10 in 5 out of 6 chosen indicators. In the second Health Holding of Plzeň Regional Hospital, it was proved that effectiveness was increased only in the cases of non-financial indicators and in financial indicators there was no indication of benefits.

Table 1: Summary of the effectiveness of horizontally integrated hospitals in Czech Republic (own work)

Evaluated Variable	Correlation coefficient	Slope	p-value	Significance (for $\alpha \leq 0,05$)	Significance (for $\alpha \leq 0,10$)
<i>A. The health holding of Plzeň region</i>					
Average Economic Outcome	0,519	546,803	0,062	NO	YES
Average Current Ratio	0,832	0,057	0,001	YES	YES
ROA	0,139	0,002	0,350	NO	NO
Average Duration of Treatment	-0,924	-2,169	$6,58 \cdot 10^{-3}$	YES	YES
Bed Usage in Days	-0,930	-5,628	$4,95 \cdot 10^{-5}$	YES	YES
Average Bed Occupancy per Physician	-0,922	-0,763	$7,64 \cdot 10^{-5}$	YES	YES
<i>B. The hospital holding of Středočeský region</i>					
Average Economic Outcome	-0,065	-982,911	0,423	NO	NO
Average Current Ratio	-0,134	-0,008	0,356	NO	NO
ROA	0,037	0,001	0,466	NO	NO
Average Duration of Treatment	-0,977	-0,153	$5,99 \cdot 10^{-7}$	YES	YES
Bed Usage in Days	-0,656	-1,072	0,027	YES	YES

Average Bed Occupancy per Physician	-0,777	-0,298	0,007	YES	YES
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These results are in accordance with the research of Cuellar and Gertler, who, in their study “strategic integration of hospitals and physicians” showed that integration has little effect on efficiency; however it is associated with an increase in prices, especially when the integrated organisations are exclusive and they occur in less competitive markets.

In considering this information, it is essential to interpret various indicators of effectiveness - for example, the indicator of the average occupancy of hospital beds per doctor. This indicator can have two interpretation results. From the viewpoint of economic effectiveness, the lower number of patients can mean a decrease in effectiveness, but from the viewpoint of quality healthcare, this can be seen as a positive indicator because doctors can give more attention to the lower number of patients and thus higher quality care.

Certain limits to research must be acknowledged also in the choice of samples because integration of medical organisations does not yet have a very long tradition in the Czech Republic, but new institutions are forming in the Czech Republic due to both vertical and horizontal integration, which gives opportunity for future research. We can focused on foreign hospitals too and financial and human resources efficiency in our future research.

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