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## Horizontal Integration of Hospitals – Does it have an Impact on their Effectiveness?

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### Abstract

The aim of this paper is to discuss the effect of horizontal integration of hospitals on efficiency of hospitals. Whereas Czech hospitals use about 50% of all expenditure on healthcare, it is necessary to focus on their thriftiness and efficiency. Hospitals must work with limited economic resources and it is essential to know how to use these resources efficiently. In the last two decades we can see strong trends of hospitals integration. We now have five holdings and the last one was founded in January 2015. Annual reports were used for analysis from each hospital from 2004 to 2013, and also information from the Institute of Health Information and Statistics of the Czech Republic. Parts of the annual reports include economic and also non-economic results. This data was statistically analyzed and examined according to whether there was a significant improvement in values after integration. For example, a linear trend was used for evaluation by using a coefficient correlation and a t-test was used for statistical significance. One of the limitations of the research was that the research was based on only two specific samples existing in the Czech Republic. Other holdings have either a very short or a very long period of being integrated and therefore it is very difficult to find specific comparable information. Other limitations of this research were the choice of appropriate financial and also non-financial indicators. Results from analysis were compared with results of other published studies in other countries.

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### 1. Introduction

In the Czech Republic until 1991 there was a system of financing health care by means of the state budget, but in 1992 the system was replaced, whereby health care is financed by health insurance. From this year on, public health

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insurance financed health care by means of payment according to performance. Hospital performance was shown in points and the value of points was derived from income and expenses of the health insurance. This unfortunately led to the pursuit of points, unnecessarily long hospital stays and of course also to a lack of financial resources for health care. From 1. 1. 1997 the Department of Health introduced a new system list of health performance, whereby the points value directly determined the charge in Koruns. In 2007 there was another fundamental change to the system and hospitals were financed by means of so-called across-the-board payments. The amount of this across-the-board payment was based on the assumption that the vast majority of hospital expense is fixed i.e. it is not determined by the number of patients or the number of actions undertaken. According to Gladkij et al. (2003), these expenses formed about 75 % of total hospital expenses. The amount of this across-the-board payment was established on the basis of actual performance done in the previous year.

The across-the-board payment of financing hospitals in itself had many problems:

- the budget was raised very slowly on the basis of agreement with health insurance companies
- in regard to the fact that the amount of this across-the-board payment was established on the basis of management from the previous year, the hospitals that saved received less financial means, and on the contrary, those that did not save had big advantages
- there occurred some decisions to lower the quality of patient care, quality and renowned hospitals could not accept new patients because the budget had already been used up and on the contrary, hospitals that did not have a prestigious name had leftover finances and could accept patients without limits. (Kozeny, Nemeč, Karnikova and Lomicek, 2010; Gladkij et al., 2003)

There was another fundamental change in financing the hospital system on 1. 1. 2012. Diagnosis Related Groups (DRG) started financing 75 % of all hospital care with their payment system. This DRG system classifies groups of patients based on their diagnosis and on the basis of the estimated average expense for treatment, which is determined by the relative weight of the given group. This system has been operating throughout the world since 1962 and since 1996 and it was gradually tested and then introduced into the Czech Republic, but it only became fully operational in the year 2012.

From the perspective of expenses according to Kozeny, Nemeč, Karnikova a Lomicek (2010), the system of prospective payment based on the DRG system operates as a more effective method for providing hospital services. According to the Minister of Health, the main benefits of DRG include:

- **Justice.** Justice is defined as paying for the services that one receives. The principles of DRG should remove main disputes about unjust dividing up of financial help of the compensation system, the so-called feuds between small and large hospitals, faculties and district hospitals.
- **Measurability.** The DRG system should help measuring and comparing productivity a quality of health care.
- **Transparency.** The DRG system should function to prevent corruption settings due to clear price limits for health services.
- **Effectiveness.** The DRG system is focused on not only economic performance, but also on the quality of health care provided and it should assist revealing the real effectivity of managing individual hospitals.

### 1.1. Effectiveness of hospitals

Evaluating effectiveness of hospitals is a highly complex process and we can focus on two different types of effectiveness:

- a) Economic effectiveness – these are bound to financial indicators, for example expenses for 1 hospital bed, takings for bed tending activities and economic results
- b) Non-economic effectiveness – these are not bound to financial indicators, for example hospital bed use, bed occupancy, etc.

The most widely used method to evaluate hospital effectiveness is Data Envelopment Analysis (DEA). DEA is a linear programme based technique for measuring the relative performance of organisational units, where the

presence of multiple inputs and outputs makes comparisons difficult. Hospitals are evaluated, especially the relative technical efficiency of an individual hospital based on observed data, for example Tiemann and Schreyogg (2012), Chu, Liu and Romeis (2002), Hsieh, Clement and Bazzoli (2010), O'Neill, Rauner, Heidenberger and Kraus, (2008); Sikka, Luke and Ozcan (2009).

Other methods can also be used to evaluate effectiveness, for example;

- BSC - concept Balanced Scorecard (BSC) is directed at critical areas of measuring effectiveness – financial perspective, customer perspective, internal process, 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 measuring effectiveness. (Steward and Bestor, 2000; Bisbe and Barrubés, 2012; Chow, Gaunulin, Haddad and Williamson, 1998; Lin et al., 2013),
- 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. (Lovata and Costigan, 2002), etc.

### 1.2. Integration of hospitals

Integration can be either horizontal or vertical. Horizontal integration is defined as the coordination of activities across operating units that are at the same stage in delivering services. Horizontal integration involves grouping organizations that provide a similar level of care under one management umbrella. We can see two primary benefits of horizontal integration:

- increased market power
- greater efficiency. (Huckman, 2006; Lake et al., 2003).

The benefits and risks of integrating is described by a number of foreign authors e.g. Bazzoli, et al. (2000), Baker (2001), Clement et al. (1997), Lake et al. (2003), Ackerman (1992) etc. The positives of integration authors state are:

- Access to better resources due to the collective purchasing
- Greater negotiating power
- Costs reduce and improve medical technology through information exchange
- Elimination of service duplication
- Providing complex services
- Allocation of risk between multiple organizations
- Enhanced relationships with customers
- Improved quality of care

Vertical integration is defined as the coordination of services among operating units that are in different stages of delivering patient services. Walston, Kimberly and Burns (1996) present the benefits of vertical integration in health care as follows:

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

In the Czech Republic there were 166 hospitals in 2014. From this number, some of them were included in holdings or in other types of horizontal integration. Three types of horizontal integration are of great interest:

1. Horizontally integrating holdings that do not have financial cohesion (managed as autonomic accounting entities), which are presented particularly by holdings owned by regions:

- *The Health holding of Kralovehradecky region.* One of the oldest associations of hospitals owned by a region in the Czech Republic. Founded in 2004, it originally included five of the following hospitals: City Hospital Dvur

Kralove nad Labem, Regional Hospital Jicin, Regional Hospital Nachod, Regional Hospital Rychnov nad Kněžnou, Regional Hospital Trutnov. In 2013, the Regional Hospital Rychnov nad Kněžnou became a part of Regional Hospital Nachod, therefore 4 hospitals are currently part of this association.

- *The Hospital of Ustecky region.* Hospital of Usti nad Labem region was founded on September 1, 2007, and currently it comprises 5 hospitals: Děčín Hospital, Chomutov Hospital, Most Hospital, Teplice Hospital, and Masaryk Hospital in Usti nad Labem.
- *The Hospital holding of Stredocesky region.* The Hospital holding of Stredocesky region was founded on September 18, 2009, and its original members were 5 hospitals: the Hospital of Rudolf and Stefanie Benesov, the Regional Hospital Kladno, the Regional Hospital Kolin, the Regional Hospital Mlada Boleslav, and the Regional Hospital Pribram. Hospital Kutna Hora became a part of the association on January 1, 2010, but insolvency proceedings were initiated in February 2010.
- *The Hospitals of Pardubicky region.* The Hospitals of Pardubicky region are the youngest association, and it was established on January 1, 2015. It links the following hospitals: The Hospitals of Pardubicky region - Pardubice Hospital, Chrudim Hospital, Svitavy Hospital, Litomyšl Hospital, and Usti nad Orlicí Hospital.

2. Horizontally integrated hospitals consolidated into one corporate body. There is one holding of this kind in the Czech Republic:

- *Health holding of Plzen region.* The health holding of Plzen region was formed on June 30, 2010. The members of the holding company are the following hospitals: Domazlice Hospital, Klatovy Hospital, Rokycanska Hospital, Stod Hospital, the hospitals of follow-up care of Horazdovice, and the hospital of follow-up care of Svata Anna.

3. Horizontally integrating hospitals, with hospitals acting as subsidiary companies of their parent company. The company Agel could be a typical example of this integration in the Czech Republic. AGEL was founded by a social contract in 1990. In 2003 it was legally changed from a private limited company to a joint-stock company. The company owns runs or rents 24 medical facilities.

This article focuses on horizontal integration of the holding type without financial cohesion and deals with the question whether this type of horizontal integration of hospitals is effective and how these hospitals fare compared with average chosen indicative values of how effective Czech hospitals are.

## 2. Analysis

The goal of this analysis is to find out whether horizontal integration of hospitals leads to greater effectiveness in those hospitals. In order to verify this, graphic analysis was used to compare averages of chosen individual parameters with averages of these individual parameters for all hospitals.

There were 166 hospitals in the Czech Republic in 2013. This number included holdings and other types of horizontally integrated hospitals. Table 1 lists all these horizontally integrated hospitals. The first holding – the health industry holding of the Kralovehradecky region was founded in 2004 and contains four hospitals. Until the present, a total of five holdings (or other integrations) have been created.

Table 1. Networked hospitals in the Czech Republic (own work)

Hospitals
Health holding of the Kralovehradecky region (founded in 2004)
- Dvur Kralove nad Labem City Hospital
- Jicin Regional Hospital
- Nachod Regional Hospital
- Rychnov nad Kněžnou Regional Hospital (since 2013 it has been part of the Nachod Regional Hospital)
- Trutnov Regional Hospital
Hospitals of the Ustecky region (founded September 1, 2007)
- Děčín Hospital

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- Chomutov Hospital
  - Most Hospital
  - Teplice Hospital
  - Masaryk Hospital in Usti nad Labem
- Hospitals of the Ustecky region (founded September 1, 2007)
- Děcin Hospital
  - Chomutov Hospital
  - Most Hospital
  - Teplice Hospital
  - Masaryk Hospital in Usti nad Labem
- Hospital holding of the Stredocesky region (founded September 18, 2009)
- Rudolf and Stefanie Benesov Hospital
  - Kladno Regional Hospital
  - Kolin Regional Hospital
  - Mlada Boleslav Regional Hospital
  - Pribram Regional Hospital
- Health holding of the Plzen region (founded June 30, 2010)
- Domazlice Hospital
  - Klatovy Hospital
  - Rokycanska Hospital
  - Stod Hospital
  - Horazd'ovice follow-up care hospitals
  - Svata Anna hospitals of follow-up care
- Hospitals of the Pardubicky region (founded January 1, 2015)
- Pardubice Hospital
  - Chrudim Hospital
  - Svitavy Hospital
  - Litomysl Hospital
  - Usti nad Orlici Hospital
- 

Only two holdings were selected for further research – the Stredocesky region hospital holding and the Plzen 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 Kralovehradecky 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 Ustecky 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 integration
- The hospitals of the Pardubicky 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. The non-economic results often needed to be included in order to complete various values in each annual report. The following indicators were chosen –financial and non-financial. These can be utilized to evaluate performance. These indicators are:

#### **Economic and non-economic indicators**

- Economic outcome
- Average duration of stay
- Bed Usage in days
- Cost per day of treatment

2.1. *Economic outcome*

Average economic results per hospital had profits each year except for the year 2013. These average values have neither an increasing nor a decreasing tendency. When comparing results of these two holdings, we can conclude that the Plzen Region had worse economic result values than the average Czech Republic values in each year except for 2013, when the economic result for the Plzen Region was CZK 9,387,830 more than the national average. The Stredocesky Region has a worse economic result than the national average in every year that these figures were compared. In the year 2006 the Stredocesky Region economic result was closer to the national economic result average when the difference was CZK 1,540,740. Hospitals in the Plzen Region entered into a holding in the year 2010 so it is impossible to prove that this holding achieved a better economic result than before they entered the holding. Concerning the Stredoceskeho Region, hospitals joined into a collective one year earlier, in 2009, and their situation is quite the opposite. When we refer to the graph, it is clear that the economic result lowered, and in the year 2009 the average economic result was CZK 3,670,000 and then in 2013 it was CZK 38,411,000. The complete development can be seen on graph 1.

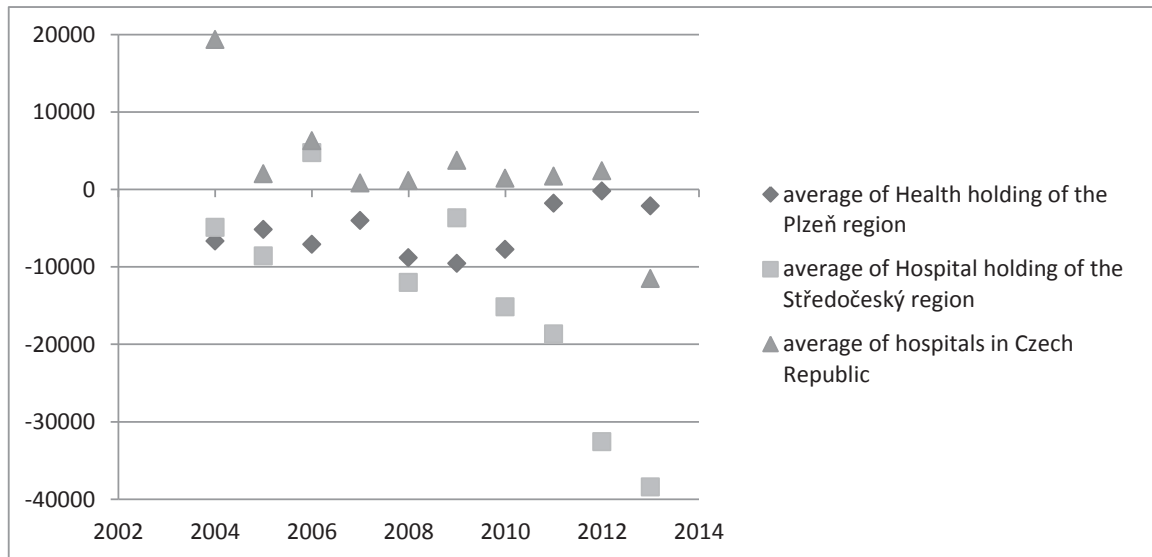


Fig. 1. Trends of average economic results in thousands of CZK (own work)

2.2. *Average duration of stay*

Graph 2 illustrates trends in average treatment time. The national average has a decreasing trend, as also the results of both hospital holdings. The national average is higher than the results from both holdings. In the Plzen holding, the average treatment time was lower than the national average in each of the years used for comparison, except in the year 2004 when it was 0.075 days longer than the national average. In the Stredoceskem Region, in each year used for comparison, the average treatment time was lower than the national average. Concerning individual hospitals merging into holdings, hospitals had better average results after the merging than before the merging. Development specifics are seen in Fig. 2.

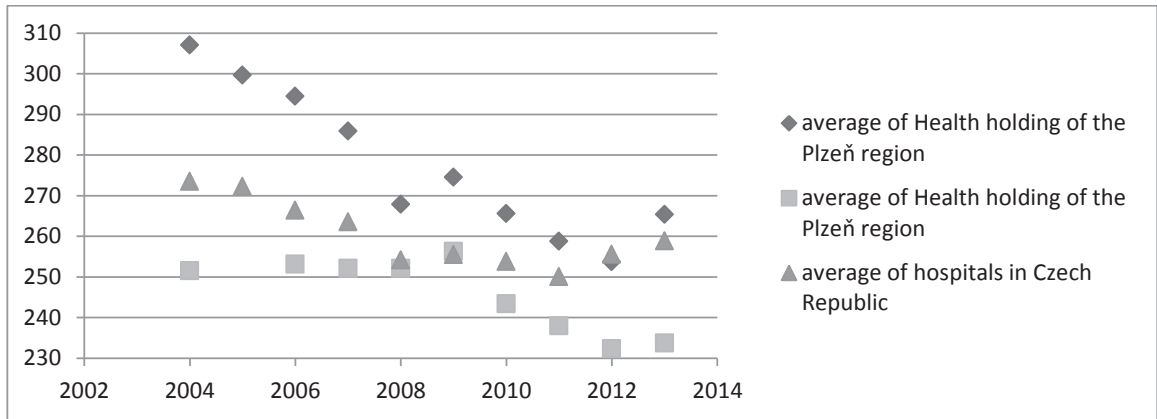


Fig. 2. Trends of average duration of stay (own work)

### 2.3. Bed Usage in days

In the year 2010 there was a slight increase in bed use and then a slight decrease. Bed use is on average about 250 days a year. In the Plzeň Region, in each of the years used for comparison, the average bed usage in days was higher than the national average, except for the year 2012 when the bed usage was 1,833 days lower than the national average.

In the Stredoceskem Region, in each of the years used for comparison, bed usage in days was lower than the national average except for the year 2009 when the average was 0.85 days higher than the national average. In every hospital we can see that the bed usage lowered even after hospitals entered into a holding. This trend can be seen in Fig.3.

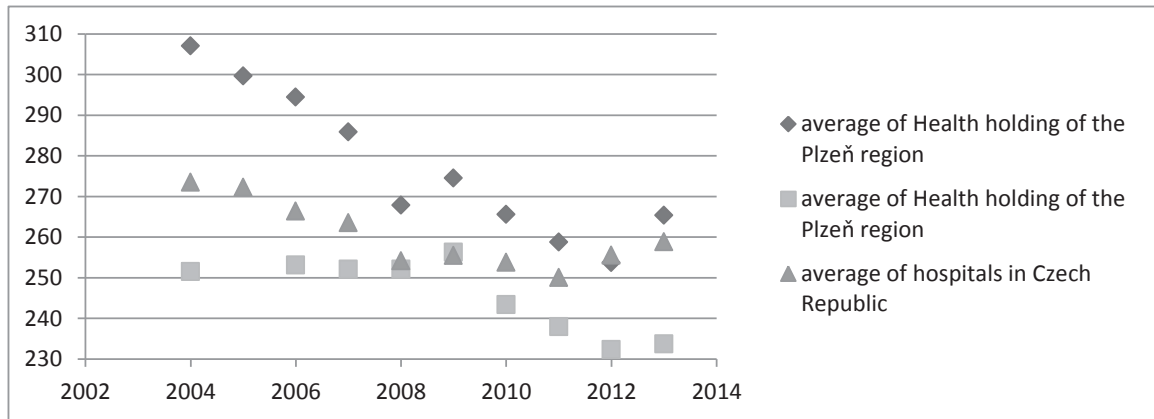


Fig. 3. Development of average bed usage in days (own work)

### 2.4. Cost per day of treatment

Expenses for one treatment day have an increasing average trend for the entire nation. During a ten year period the expenses increased from CZK 3,303 to CZK 5,461. Regarding individual holdings and their results, the Plzeň Region had lower expenses than the national average per treatment day in each of the years used for comparison, except in the year 2013, when expenses per one treatment day were CZK 258.5 higher than the national average. In the Stredoceskem Region, average expenses per one treatment day were also lower than the national average. Expenses had an increasing trend regardless of whether a hospital entered or did not enter a holding, which is

evident also in all hospitals. The entire development is seen in Fig. 4.

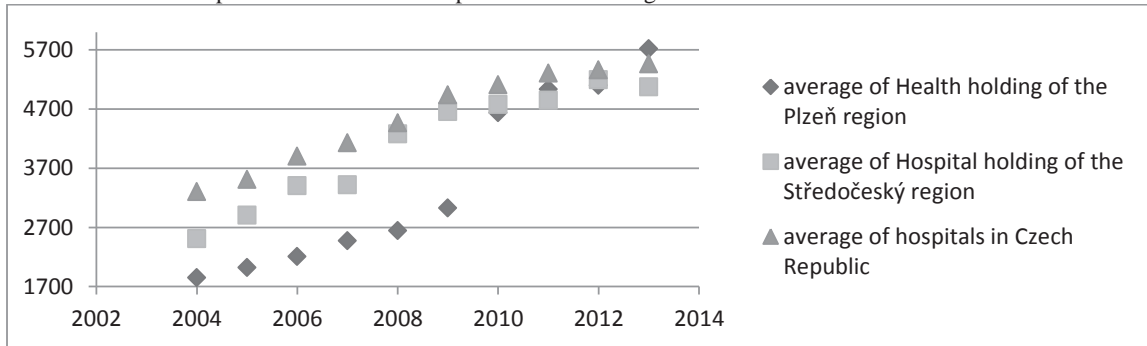


Fig. 4. Development of treatment cost per day (own work)

### 3. Conclusion and discussion

This analysis was based on comparing the average values of two holdings to that of the national average. As long as we look at individual results, then undoubtedly these two indicators - cost per treatment day, and duration of stay - have better results than the national average. Concerning non-economic indicators, bed usage days vary in the two holdings, and one has better results than the other. After entering into a holding, they showed lower values which then again increased moderately in the last two years. Regarding management results, it is not possible to prove, that entering a holding has a positive effect on hospital results. Results fluctuate below average, and also show some losses, which cannot be considered a positive trend.

We can compare these results with foreign authors like Walston, Kimberly and Burns (1996). They unequivocally present benefits such as: lowering costs and eliminating unneeded services, economics of scale, increased market and negotiating power, profit and market share gains, better recruitment and longer retention of staff and also environmental acceptance.

The above-mentioned analysis did not prove that integration has an entirely clearly positive influence on all indicators. The results were better in some ways and worse in others. The question is, what other factors influenced these results. A limit of this research is the absence of solving these other factors, which could have caused the improvements in results researched. Other limits also include that only two holdings were analysed. Other holdings have either a very short or a very long period of being integrated and therefore it is very difficult to find specific comparable information. The last limit concerns the choice of indicators chosen for analysis among the many economic and non-economic indicators possible to analyse and compare, and this choice can influence the final results.

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