

FINANCIAL PERFORMANCE AND AGGLOMERATION ECONOMIES IN THE HOSPITAL SECTOR

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Abstract

Healthcare expenses constitute serious economic burdens to state budgets. The largest part of healthcare expenditures is usually dedicated to the hospital sector. That is why analyzing factors that can have an impact on the performance of hospitals seems to be of a great importance. There can be found diverse economic theories and models – including the background of agglomeration economies – aimed at explaining the performance of hospitals. From the agglomeration economies' perspective the place of location might have a serious impact on a general situation of a particular entity. The problem of a proper location of an enterprise is quite often analyzed dividing companies for the ones operating inside or outside big cities. However, in case of hospitals it is still an open question if the place of location might have a serious influence on the economic outcomes – especially the obtained financial results. One of the most suitable tools analyzing such influence are either economic or econometric models. This article is aimed at assessing the current state of knowledge and presenting potential research gap in the analyzed matter, which should be fulfilled by the further empirical studies. As it is revealed in the article there exists a research gap concerning models conducted on the background of agglomeration economies explaining financial performance of hospitals.

Key words: agglomeration economies, hospital financial performance, hospital location, agglomeration models

JEL Code: D21, D47, I15

Introduction

Hospital treatment is usually portrayed as the one that consumes the biggest part of healthcare financial resources. Hospitals in many countries go through financial troubles making a serious economic burden to healthcare systems. That is why, it is necessary trying to find out as many factors as possible that are significantly responsible for the financial situation of hospitals. One of such factors might be the proper location of hospital. There can be found

studies suggesting that hospitals situated in the less urban areas operate more efficiently in terms of financial performance than their counterparts from the more urbanized areas (Schumann, 2008; Siedlecki *et al.*, 2016). But there are also some studies suggesting opposite situation (Krzeczewski *et al.*, 2018) or indicating that the situation might be not actually so clear and obvious (Kim, 2010; Krzeczewski 2014).

The explanation of such a state of affairs can be conducted on the background of agglomeration economies as operating either in or outside big, highly populated cities may be portrayed as one of the proxies used as agglomeration variables (Cohen & Paul, 2008). The concept of agglomeration economies is quite often identified as cost savings and productivity gains associated with geographic accumulation of economic activity arising from the presence of cities (Lucas, 1988; Munn & Padget, 2015).

Generally, there might be distinguished three types of the agglomeration economies (Claver-Cortés *et al.*, 2016): urbanization economies – concerning the concentration of companies running activity in the same geographic area that are able to develop diverse economic activities (the idea of complementary services), localization economies – concerning concentration of companies running activity in the same geographic area that are able to develop similar economic activities (the idea of clustering companies) and knowledge-intensive economies – concerning concentration of companies running activity in the nearby of the organizations that are able to produce knowledge, which can be then transferred and incorporated by these first ones (coopaeration with universities, technology transfer centers, etc.).

A positive effect of agglomeration economies can be obtained mainly due to such factors as: lower information costs, shared resorces or proximity of customers, suppliers and trasportation facilities (Henderson *et al.*, 2000), which are typical for highly populated areas like big cities. However, the existence of the agglomeration effect might be also associated with some drwabacks. There are proofs that the higher density of economic activity is, the higher the land costs and the higher the labour costs per employee are (Jennen and Verwijmeren, 2010). What is more, high accumulation of hospitals in a particular geographic area might also result in “medical arms force“ between them (Robinson and Luft, 1985).

Most of the studies dedicated to the matter of hospital financial performance analysis, that can be associated with the concept of agglomeration economies, include methods of financial analysis and such methods of statistics as for example statistical hypothesis testing. However, this research is aimed at finding out if there are any studies explaining the strength of the influence of the agglomeraion economies on the financial performance in hospital

sector. The most suitable tools analyzing such influence are either economic or econometric models. The underneath analysis reveals that there occur a research gap concerning models conducted on the background of agglomeration economies explaining financial performance of hospitals.

1 Study design and methods

To find out the main research directions in the field, the author of this article decided to conduct a comprehensive literature review in the analyzed matter. The author decided to explore the articles published in well recognized peer-reviewed journals included into Journal Citation Report and/or indexed in Web of Science Core Collection database.

The main idea of this analysis was to find out if there are any models conducted on the background of the agglomeration economies, concerning especially hospital sector, explaining financial performance of entities and if so, what the main determinants of financial performance are.

As the first step the author identified and analyzed the articles concerning modeling aspects in terms of the agglomeration economies strictly from the hospital sector. Although some of such studies were identified, none of them was strictly dedicated to financial performance assessment in hospital sector. Hence, another step it was to identify and analyze the models dedicated to financial condition assessment in terms of the agglomeration economies also from other sectors of economic activity.

Bearing in mind the limitations towards the number of references used in the article (max 10-15 references), the author – conducting the review – tried to choose, after initial selection, the studies that would reflect the analyzed problem in the best possible way.

All the research studies presented in the review below are chronologically arranged according to the year of the publication.

2 Agglomeration economies' models in hospital sector

The concept of agglomeration economies has been so far applied in hospital sector. There have been also conducted studies trying to explain different aspects of economic activity with the usage of modeling solutions. A short review of such the studies is presented below.

The first study incorporated into the review was conducted by Robinson and Luft (1985). Although, these authors did not mention the concept of agglomeration economies straightforward in their study, it is clearly visible. They analyzed the impact of the hospital

market structure on different aspects of hospital activity including: inpatient admissions, outpatient visits, average length of stay, and average cost – expressed as cost per patient and cost per patient day. As the research sample they used U.S. community hospitals. The market structure in the study was based on the density ranges of hospitals in a particular area and the physical proximity of one hospital to the other. It was used as an explanatory variable in the models presented in the study. The authors proved that hospitals with monopolistic positions within their local area can supply medical services at significantly lower costs as compared to hospitals in more competitive environments, indicating that it might be the result of “medical arms race“ between hospitals operating in the same area.

Another identified study in the analyzed matter was conducted by Henderson *et al.* (2000) who checked the influence of agglomeration economies on the demand-threshold analysis using data concerning selected types of medical services supplied by hospitals from different counties of Texas. In the empirical model they used as the dependent variable the frequency of the specified services in a particular county. They estimated negative relationship between the geographic market’s distance from an urban center and the frequency of the service providers.

Cohen and Paul (2008) analyzed the problem of agglomeration economies in Washington State hospitals using the flexible cost function model. They distinguished nine cost centres in hospitals including inpatient care, psychiatric inpatient care, other inpatient care, surgery, radiology, therapies, outpatient care, administration, and other. Their agglomeration measure was based on a weight sum of labor in the nearby hospitals, where the weights depended on the distances between hospitals. They revealed that geographic concentration is important for reducing costs for most of the cost centers applied in the study.

Friedson and Li (2015) showed how spatial concentration of hospital services can decrease the costs of obtaining intermediate medical services understood as different laboratory tests supplied to hospitals by specialized medical labs. To do so, the authors used in their models such dependent variables as employment in medical laboratory, wages of laboratory workers and average price of medical laboratory test. The study was conducted with the usage of the data from the U.S.

All the studies presented above tried to explain the impact of agglomeration economies on different dependent variables in hospital sector. However, none of the studies was focused strictly on hospital financial performance but rather on the other aspects of economic activity.

3 Models of financial performance conducted on the background of agglomeration economies

Due to the fact that the agglomeration economies can be associated both with the benefits as well as some costs, it is worth to use in the agglomeration economies' analyses the variable that include the net effect of the costs and effects. Financial condition analyzed in terms of profitability can be portrayed as a kind of such a variable (Jennen and Verwijmeren, 2010). Underneath there is presented the review concerning financial performance models using the concept of the agglomeration economies.

Kukalis (2010) conducted the study, using companies from semiconductor and pharmaceutical sectors, analyzing financial performance on the background of the agglomeration economies between clustered and nonclustered companies and dividing them according to the stages of industry life cycle. What is more, the author also analyzed the situation of the companies taking into consideration different economic circumstances distinguishing in the study the period of economic contraction. There were presented few profitability models in the study in which as dependent variables there were used return on assets (ROA) and return on sales (ROS) ratios. The first one was calculated as net income divided by total assets whereas the latter as net income divided by net sales. It turned out that, regardless of economic circumstances, no significant differences in financial performance between clustered and nonclustered companies in the early stages of the industry life cycle occurred. However, nonclustered companies in the later stages of the industry life cycle were characterized by higher profitability than their clustered counterparts. The author concluded that, according to the obtained results, the enthusiasm for clustering companies should be tempered.

Jennen and Verwijmeren (2010) analysing big sample of single-establishment Dutch companies made a multidimensional assessment concerning the impact of agglomeration economies on financial condition analyzed mainly by the prism of profitability. In the study they analysed the agglomeration effects in terms of urbanisation economies as well as localisation ones. In the presented models as a main dependent variable they used five-year average of a firm's return on asset ratio (ROA) – based on EBITDA (earnings before interest, taxes, depreciation and amortization) in the numerator and total assets in the denominator. As explained variables, in the study, there were used such factors as: turnover per employee, payment per employee or land costs. The authors mention that, concerning profitability measure, they checked different ways of calculating the ROA such as using EBIT (earnings

before deducting interest and taxes) in the nominator and non-fixed assets in the denominator, but the obtained results were similar. They also used eight-year ROA instead of five-year one. All in all, they found that, in general, higher levels of employment density are associated with the lower levels of ROA obtained by the analyzed companies, which points out that positive agglomeration effect might be then overestimated in the literature. The authors made also a remark that although their results might be characteristic for relatively small countries like Netherlands, it would be desired to conduct similar analyses in larger countries.

Stavropoulos and Skuras (2015) using the concept of agglomeration economies and big sample consisting of the manufacturing industry companies from 15 EU member states made the assessment of two profitability measures – return on assets ratio (ROA) and profit margin ratio. In the study, the first one is calculated as profits or losses before taxation to the value of total assets whereas the latter is expressed as profits or losses before taxation to operating revenue, including sales, stock variation and other operating revenues, but excluding VAT. According to their results the factors associated with agglomeration economies affect profitability in a very moderate way.

The foregoing review of the studies concerning the models aimed at assessing financial performance of entities on the background of the agglomeration economies indicates that there were just a few studies identified in the analyzed matter. Also the number of economic industries where such the studies were conducted is limited. Hence, it seems that this is a relatively new and unexplored problem and, as some of the authors indicate, needs further research and examinations.

Conclusion

To conclude the considerations above, it might be said that in a classic way the agglomeration economies are mainly associated with productivity gains, lower production costs, etc.; whereas their impact on financial performance is still portrayed as kind of novelty.

Despite the fact that there can be found some studies concerning the financial situation of hospitals, which can be associated with the concept of the agglomeration economies, it seems that there is still a lack of the research on the subject that would include either economic or econometric modeling solutions explaining the financial performance of hospitals. The models from hospital sector, presented in this article, are rather focused on different aspects of economic activity than financial performance of hospitals.

It was also pointed out that combining the concept of agglomeration economies with financial performance as far as modeling solutions are concerned is present in the current

literature, though not in the literature dedicated to the hospital sector. What is more, it is worth to have in mind that the number of such researches, included into the Journal Citation Report and/or indexed in the Web of Science Core Collection database, identified by the author of this article is limited. That is why, it seems that this topic needs further and careful exploration.

The synthetic results of the conducted analysis are presented in the table below:

Tab. 1: Agglomeration economies and financial performance – model solutions

Study	Economic sector	Country	Dependent variable
Agglomeration economies' models in hospital sector			
Robinson and Luft (1985)	Hospital	USA	inpatient admissions outpatient visits average length of stay cost per patient cost per patient day
Henderson <i>et al.</i> (2000)	Hospital	USA	frequency of the specified services in a particular county
Cohen and Paul (2008)	Hospital	USA	cost function
Friedson and Li (2015)	Hospital and medical laboratory	USA	employment in medical laboratory wages of laboratory workers average price of medical laboratory test
Models of financial performance concerning agglomeration economies			
Kukalis (2010)	Semiconductor and pharmaceutical	No specified	ROA ROS
Jennen and Verwijmeren (2010)	No specified	Netherlands	ROA
Stavropoulos and Skuras (2015)	Manufacturing	EU countries	ROA Profit margin

Source: Own elaboration.

Except the problems mentioned above, another very important observation from the conducted analysis is that the most of the studies using model solutions on the background of the agglomeration economies in the hospital sector were conducted only in the USA. As there are many differences as far as construction of healthcare systems between different countries is concerned, it seems necessary to apply similar methods towards hospital assessment in other countries. Only then any generalisations in the analyzed topic would be possible to make.

The added value of the article is that it identifies an important research gap and the area for further studies concerning financial performance assessment among hospitals on the

background of the agglomeration economies. So far in the subject literature there have not been presented any models assessing financial performance conducted among hospitals and based on the concept of the agglomeration economies. It seems that interesting and valuable future research can be focused on combining the aspects of financial standing of hospitals with agglomeration economies' concept using modelling solutions. Such the analyses should be conducted among hospitals from many different countries to enable generalisations towards the obtained observations. This article gives the sound background towards such the analyses presenting the current state of knowledge and the most important studies that can be used in the analyzed matter.

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