RESEARCH ON THE USE OF ECONOMIES OF SCALE IN SERVICES INDUSTRY

Dan BODESCU[1], Simona BELIGAN[1], Mădălina Teodora MOVILĂ[1], George UNGUREANU[1]

e-mail: dbodescu@uaiasi.ro

Abstract

The research carried out in the present paper aims at carrying out researches on the use of scale ranges within the service providers with the following objectives: performing a synthetic diagnosis of the investigated units and determining the impact of the scale returns within the tourist services units.
The obtained results verify the hypothesis of the application of the service efficiency principle so that a hostel with a capacity of 4 rooms records an average cost of 250 euro room^{-1} year^{-1}. This decreases significantly in such a way that a 6-room guesthouse receives a cost of 167.7 euro room^{-1} year^{-1}. The condition that the economical units surveyed benefit from the benefits of economies of scale is that they make every effort to ensure the highest possible capacity to serve. Otherwise, there are no economies of scale, but on the contrary, high service capacities have to bear large average costs.

Key words: scale ranges, service economy, scale returns, service efficiency, economies of scale

Numerous studies have been conducted that measure economies of scale, especially in the manufacturing and banking sectors. This has happened especially in the 1990s, when rising yields have been widely tested.

Some of them have analyzed the financial sector (Walker, 1998), others (Robidoux and Lester, 1992; Morrison Paul, 2001a) and Gervais *et al*, 2006) production. These studies use a variety of methods, including the function of the translogic cost (Walker, 1998; Gervais *et al*, 2006), a mixture of the Cobb-Douglas and Translog specifications (Muldur & Sassenou, (Robidoux and Lester, 1992) and a generalized Leontief function (Morrison Paul, 2001a, 2001b).

There are few studies for tourism. The only studies are for some tourism-related industries. For example, Chansomsak (1997) finds strong evidence of economies of scale in the hotel industry in Thailand between 1982 and 1989.

In a subsequent study, Weng and Wang (2004) use transversal data on Taiwan's international tourism hotels in 2000 to show that scale-specific products exist in some joint services.

While some scale economics studies use only one cost function by regressing costs based on output and input prices, the single equation approach does not have an explicit theoretical basis without taking into account demand functions (Sinclair and Stabler, 1997) .

Production decisions that refer to a good at input prices and resource allocation are not examined in this way. Instead, the approach to the simultaneous equation attempts to provide a strong theoretical basis to allow for the general characteristics of the production function. They examine how manufacturers make their decisions subject to production possibilities.

The motivation is to achieve efficiency in estimation by combining information with different equations. To prove this, Walker (1998) uses different formulations to estimate stair elasticity for 12 Australian banks and notes that the withdrawal of input quota equations generates incorrect signs for certain coefficients.

However, the estimation of the simultaneous equation has been criticized. Syriopoulos and Sinclair (1993) doubt the empirical validity of the conditions of homogeneity and symmetry underlying the cost function. Berger (1993) also questions the opportunity to impose allocation efficiency after finding that differences in scale efficiency are not important in the banking sector.

We compare measured scale economies with different formulations for each sector. We start by estimating the translog. In the accommodation sector, the regression results from the translog system estimate show that all key coefficients are statistically significant at 1%. But the coefficients of the interaction between input and output prices are not statistically significant. This means that the

[1] "Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine Iaşi, Romania

interactions between the production and the input prices have no impact on the total cost.

With a rapid expansion of tourism in Australia to accommodate more tourists, the average variable cost will grow faster and exceed the average fixed cost, resulting in an increase in average cost. With low barriers in this area, more hotels and restaurants are built, making the market more competitive.

Generally speaking, economies of scale are more likely to exist at group level when horizontal integration takes place between hotels (Sinclair, 1998; Moraru, 2016). In this way, the level of competition is greatly reduced by the internalization of externalities and the experience and managerial knowledge will change. Instead, there are several individual units like Australia's inns and motels.

The accommodation sector is easier to access and the level of competition is greatly accessed. In 2007-08, the increase in capital spending for accommodation was only 1%, much lower than the increase in capital expenditures at industry level (12.4%), reflecting the very low intensity of the very capital and the high intensity of the force the work

The entertainment service sector offers primarily museums, art galleries and other leisure services. The provision of such services requires a high level of investment, creating high fixed costs. Once facilities are furnished, they can be used at a fairly low marginal cost, and there is largely no rivalry for the extra use of these facilities.

In addition, some services are provided by government that have the characteristics of public goods. Thus, there is less competition in this sector and individual firms are likely to enjoy increasing profits.

As additional service usage will not incur large marginal costs, the more services are used, the lower the average cost. Encouraging tourism expansion will reduce the average cost and price due to increased returns, which is beneficial to consumers.

Measuring economies of scale in the Australian tourism industry has had important political implications for the opportunity to promote tourism. The political implications depend on the sector in question. The findings suggest that it is profitable to promote tourism in retail, leisure and transport services, but not accommodation. Since housing is responsible for the bulk of tourism production, as far as we can think of a tourism industry, the tourism sector is not characterized by increased profitability.

A major limitation is that industry estimates will generally not provide information on the shape of long-run average cost curves, as technological change and size distribution of firms can not be fully controlled (Sato, 1975).

MATERIAL AND METHOD

Research on the use of scale output on service units required an economic analysis of a sample of 20 accommodation units in Suceava County. The economic analysis was made using the most important balance sheet indicators. This analysis was structured on two levels: determining the main economic and financial indicators specific to the sampled population and highlighting the scale returns in accommodation services. The hypothesis from which the research was conducted is the statement: Unity service servings increase if they increase the capacity to serve. This would also be confirmed by the reduction in average cost depending on the capacity to serve.

In order to determine the potential effects of scale yields in the survey sample, the regression equation was determined between the number of chambers (independent variable) and the liquidity, solvency, and profitability indicators.

Liquidity is the ability of an enterprise to convert its production or certain assets into cash and can be determined using the following indicators:

Current liquidity (long-term liquidity) is calculated as the ratio between the current asset and the current liability and consists of the extent to which the company's debt with a maturity of less than one year is covered by the current assets. The current rate values should typically be between 1.8 - 2.0 and not exceed 2.5 meaning the bearing stock.

Intermediate liquidity (acid test) shows to what extent total debts can be covered within the shortest possible time, expressing the ability of an enterprise to meet short-term debts in cash receivables and cash. It is calculated as a ratio between the current asset without taking into account existing stocks and the current liability.

The immediate liquidity expresses the possibility to pay short-term debts through cash in cash, placements and bank deposits It is calculated as the ratio between the household's current account and the current liabilities of the firm analyzed and must have a minimum value of 0.2-0.5 and values greater than 1 reflect good liquidity.

Solvency is the capacity of the patrimonial unit to meet its payment obligations at the fixed repayment term resulting from the current activities and from the commitments entered into.

The total debt ratio represents the ratio between total debts and the total asset multiplied by 100. Following the evaluation of the reports reflecting the company's level of indebtedness and financial autonomy, its solvency is assessed. The optimal value is 0.4 (40%)

Short-term debt ratio = (short-term liabilities total assets^{-1})*100 The optimal value is 0.2 (20%)

Long-term debt ratio = (long-term debt total asset^{-1})*100. The optimal value is 0.4 (40%)

Profitability expresses the company's ability to make profits in relation to its own interests, namely in the economic area (in the production activity). Economic performance is measured by performance rates called profitability rates and profitability rates.

The rate of economic return is an indicator that expresses how effective the company's assets are and how they contribute to achieving financial results.

RESULTS AND DISCUSSIONS

The economic analysis of the main indicators registered by the researched sample indicates the values:

Indicators from bilanț - fixed assets - total 1,140.3 mil. euro; current activities - total, out of which 286.2 mil. euro; stocks 141.9 mil. euro; receivables 92.1 mil. euro; house and bank accounts 48.0 mil. euro ; prepayments 4.6 mil. euro; liabilities 762.6 mil. euro; advance income 351.0 mil. euro; provisions 40.7 mil. euro; capital - total of which: 227.9 mil. euro; paid subscribed capital 249.0 mil. euro.

Indicators from the profit and loss account mil. euro: net turnover 538.4 mil. euro; total income 557.1 mil. euro; total expenses 537.8 mil. euro; gross profit 23.4 mil. euro; net profit 14.8 mil. euro.

Indicators from data information : average number of employees 5.9 pers. average price * no rooms 2,467.7 euro room^{-1} year^{-1}; no full days occupied 24.3 days; occupancy rate 2012 - 44.3%; occupancy rate 2013 - 43.8%; occupancy rate 2014 - 48.6%; occupancy rate 2015 - 128.9%; occupancy rate 2016 - 67.9%; total occupancy rate - 66.7%;

The analysis of the liquidity, solvency and profitability indicators in relation to the number of rooms (Person Correlation coefficient) indicates a weak or very poor link between the two groups of indicators from 0.15 to 0.39 in most cases with a negative value , indicating an inverse correlation (*table 1*).

Table 1

Determining the relationships between no. rooms and economic performance

Coefficients	Coefficient of regression	Pearson coefficient
Active / room	0.14	-0.27
Current liquidity	0.12	0.32
Intermediate liquidity	0.12	0.32
Immediate liquidity	0.06	-0.07
Total debt ratio	0.05	-0.15
Short-term debt ratio	0.05	-0.15
Long-term debt ratio	0.05	-0.15
Rate of economic profitability	0.15	-0.34
Return on assets	0.15	-0.34
Rate of financial return	0.05	0.21
Overall rate of return	0.15	-0.39

These values do not justify the hypothesis that increased service capacity determines higher economic returns

As the average cost on the accommodation room was determined, it was noticed that the principle of scale efficiency, which means cost reduction with the increase of the service capacity, is not checked.

These values do not justify the hypothesis that increased service capacity determines higher economic returns *(figure 1).*

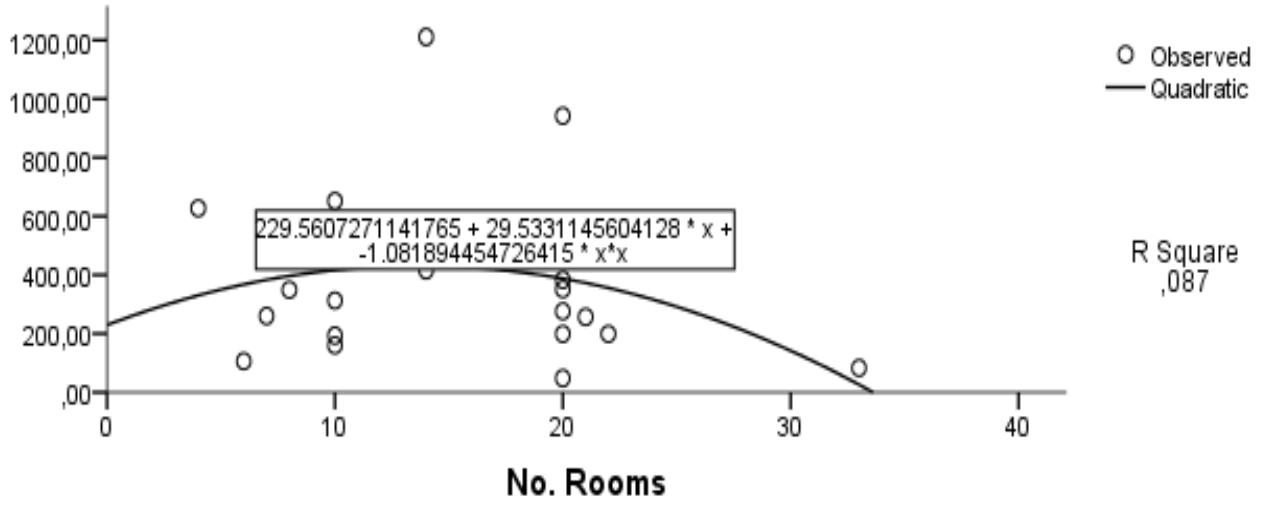

Figure 1 **Average cost dynamics by serving (euro)**

We justify this situation by the fact that the occupancy rate of the investigated pensions is very variable and in these conditions the level of the average costs is taken from this variability *(figure 2).*

As the average cost on the accommodation room was determined, it was noticed that the principle of scale efficiency, which means cost reduction with the increase of the service capacity, is not checked.

We justify this situation by the fact that the occupancy rate of the investigated pensions is very variable and in these conditions the average cost level is taken from this variability.

The investigated economic units recorded an average occupancy of 57%, with the highest share being at 95.5% with a number of 15 rooms and a minimum of 8.8% with a number of 20 rooms.

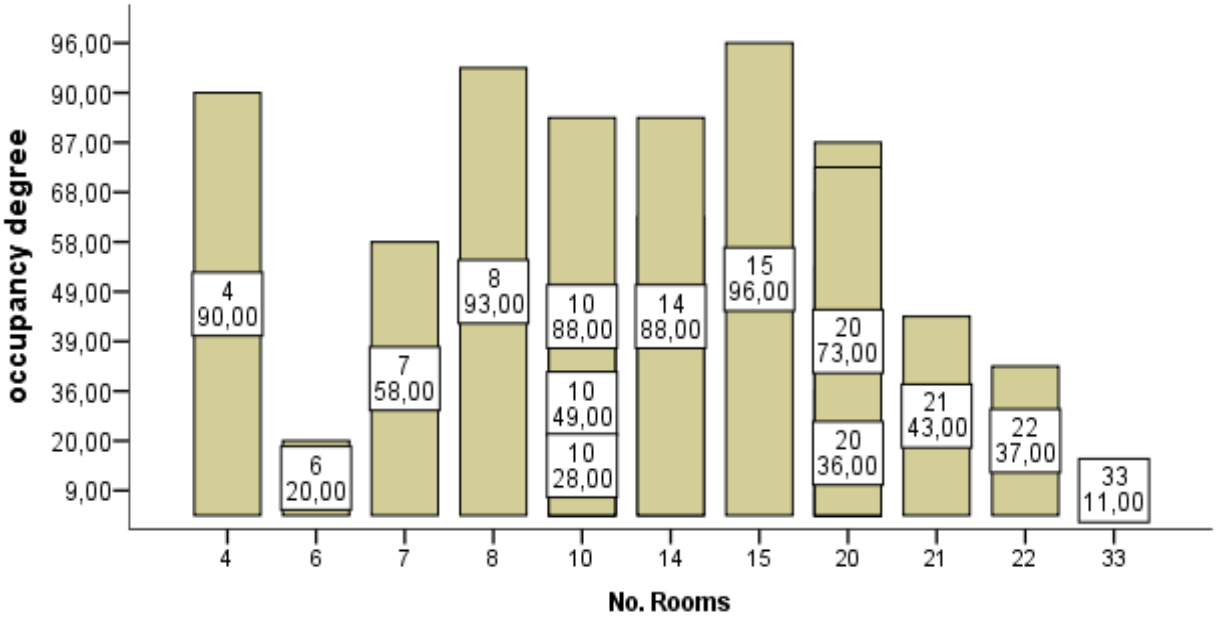

Figure 2 **Capacity occupancy by number of rooms (%)**

Consequently, we determined the average cost based on a hypothetical occupancy rate of 100%. Under these circumstances, we determined the average costs for this occupancy and to obtain the regression equation at a 100% occupation *(figure 3)*.

This situation checks the principle of scale efficiency so that as a boarding house with a capacity of 4 rooms the cost is 250 euro room^{-1} year^{-1}. This decreases significantly so that a 6-room guesthouse gets a cost of 167.7 euro year^{-1}room^{-1}.

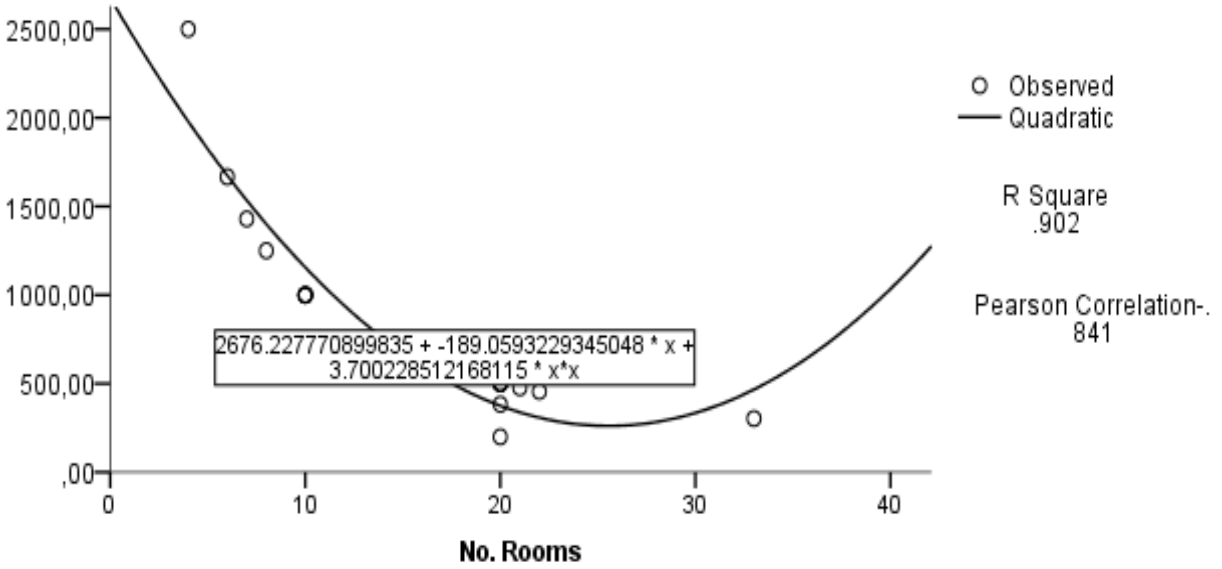

Figure 3 **Average cost dynamics by serving after homogenization of the occupancy level (euro)**

After a capacity of 20 rooms, the cost falls to less than 50 euro room^{-1} year^{-1}. Also, the increase in the average cost to a higher level of accommodation capacity is specific to the cost theory which states that with the increase in production capacity over a certain level, additional costs (eg management costs)

Table 2

Dispersive analysis ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	5203427.037	2	2601713.518	78.098	.000
Residual	566331.513	17	33313.618		
Total	5769758.550	19			

The independent variable is No. Rooms.

Under these conditions, a regression equation 2676.2 -189.1x + 3.7x^2 results statistically at a 5% error that expresses 90.2% R^2 = 0.90 the probability of correlation between the cost level and the number of rooms (*table 2*).

CONCLUSIONS

As the average cost on the accommodation room was determined, it was noticed that the principle of scale efficiency, which means cost reduction with the increase of the service capacity, is not checked. Thus, the average cost was determined by a 100% hypothetical occupancy rate.

This situation checks the principle of scale efficiency so that as a boarding house with a capacity of 4 rooms the cost is 250 euro room^{-1} year^{-1}. This decreases significantly so that a 6-room guesthouse gets a cost of 167.7 euro^{-1}year^{-1}room.

After a capacity of 20 rooms, the cost falls to less than 50 euro room^{-1} year^{-1}.

The condition that the economical units surveyed benefit from the benefits of economies of scale is that they make every effort to ensure the highest possible capacity to serve. Otherwise, there are no economies of scale, but on the contrary, high service capacities have to bear large average costs.

ACKNOWLEGMENTS

This work was co-financed from Competitiveness Operational Programme (COP) 2014 – 2020, under the project number 4/AXA1/1.2.3.G/05.06.2018,SMIS2014+ code 119611, with the title "*Establishing and implementing knowledge transfer partnerships between the Institute of Research for Agriculture and Environment - IAȘI and agricultural economic environment*".

REFERENCES

Berger A.N., 1993 - *Distribution-free estimates of efficiency in the US banking industry and tests of the standard distributional assumptions.* Journal of Monetary Economics, 20, 501-20.

Chansomsak P., 1997 - *Technical change and economies of scale in the Thai hotel industry.* Indian Journal of Applied Economics, 6(2):87-105.

Gervais J.P., Bonroy O., Couture S., 2006 - *Economies of scale in the Canadian food processing industry*. MPRA Paper 64, University Library of Munich, Germany.

Morrison P. C. J., 2001 - *Cost economies and market power: The case of the U.S. meat packing industry.* Review of Economics and Statistics, 83 (3), 531-540.

Morrison Paul C. J., 2001 - *Market and cost structure in the U.S. beef packingindustry: A plant-level analysis*. American Journal of Agricultural Economics, 83 (1), 64–76. 16.

Moraru R-A., Ungureanu G., Bodescu D., Donosă, D., 2016 - *Motivations and challenges for entrepreneurs in agritourism*. Agronomy Series of Scientific Research, 59 (1) 267-272.

Robidoux B., Lester J., 1992 - *Econometric estimates of scale economies in Canadian manufacturing*. Applied Economics, 24 (1) 113-122. 22.

Sato K., 1975 - *Production Functions and Aggregation.* North-Holland, Amsterdam, 1(3), 332-333.

Sinclair T.M., 1998 - *Tourism and economic development, A survey.* The Journal of Development Studies, 34 (5) 1-51.

Sinclair T. M., Stabler M.J., 1997 - *The Economics of Tourism.* London and New York: Routledge.

Syriopoulos T., Sinclair T.M., 1993 - *An econometric study of tourism demand: The AIDS model of US and European tourism in Mediterranean countries.* Applied Economics, 25, 1541-52.

Walker G., 1998 - *Economies of scale in Australian Banks 1978-1990.* Australian Economic Papers, 37 (1) 71-87. 23.

Weng C-C., Wang K-L., 2004 - *Scale and scope economies of international tourist hotels in Taiwan*. Tourism Management, 25 (1):25-33.