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Regression Analysis of the Sensitivity of Labor Productivity in Tourism to Operating Costs

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The paper investigates the impact of selected variables of operating costs on labor productivity in the activity of accommodation and preparation and serving of food and beverages in the period from 2010 to 2020. The research was conducted by applying more linear on a sample of all companies that submitted annual financial reports in the observed period. The authors elaborate the special characteristics of the importance of labor productivity as an important indicator of business success, methods, and importance of business cost management and analyze the sensitivity of labor productivity to the costs incurred. Based on regression analysis, it is concluded that the amount of costs has an impact on the growth or decline of labor productivity, but based on the results of some of the costs incurred in business positively affects labor productivity, which is partially confirmed by the hypothesis of this study.

Keywords: labor productivity, enterprise, financial statements, costs

Introduction

The basic task of a company is to produce products or perform certain services to meet general and individual needs. However, the degree to which general and individual needs are met depends not only on the quantity of products or services, but also on costs. Therefore, costs are a key issue in the business of the overall economy and each company individually. For the purposes of this paper and due to different cost classifications, costs according to the position in the financial statements of the company are taken as independent variables. The activity of accommodation and preparation and serving of food and beverages strives for constant improvement of business performance, which also results in an increase in operating costs. Due to the large representation of labor in the products and services provided by this activity, labor productivity will have a strong impact on the overall business of the company.

Productivity is the main determinant of value and is closely related to other factors that affect value such as quality, price, etc. Furthermore, it is important because it affects the efficiency and competitiveness of the company and the overall economic development of the country. Productivity is a measure of economic efficiency that shows how efficiently economic inputs are converted into output. Labor productivity has its natural and financial expression. In companies that perform one service or product, there is a problem of adding up the amount of various effects for the company, branch, activity.

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The first part of the paper gives a brief overview of previous research, and then theoretically defines labor productivity and analyzes the movement of labor productivity in the observed period. Furthermore, the importance and goal of operating cost management is described. In the last part, the results obtained by multiple regression and correlation analysis are presented and discussed. The basic hypothesis of this paper is "Operating costs have a negative impact on labor productivity". The hypothesis was tested through two models and was partially accepted.

Literature Review

Productivity is a concept that is mostly used in production activities. In service industries, due to the very nature of the service, the use of this concept can be significantly limited. Namely, process productivity explains how efficiently inputs are converted into economic results, and as a result of high productivity grows for the producer. Such a concept of productivity is generally, simply put, formulated as the efficiency of transformation enters the outputs, of constant quality. So in production is productivity and the concept is related to production efficiency. But in an effective service organization, productivity and perception of quality are an inseparable phenomenon (Grönroos & Ojasalo, 2005).

Productivity as a significant indicator of economic performance in a broader sense is defined as the ratio of output (output) and resources expended (input), while in a narrower sense productivity or net productivity means only labor efficiency and is defined as: "the ratio between the quantity of goods or services and the working time spent for their implementation, i.e. the amount of labor that participated in that production with normal effort" (Sunajko, 2010).

The increase in engaged assets per employee, on average annually at a rate of 7%, indicates an increase in the business strength of the company at the group level (Avelini Holjevac & Vrtodušić Hrgović, 2012, p. 73). The assumption is that "with larger assets, in principle, a higher business result is achieved" (Popović & Vitezić, 2009, p. 327). At the group level, there was an increase in both assets per employee and total and operating income per employee, but not with the same intensity (assets per employee grow faster than income per employee). "The disparity between working conditions and results reflects the lower efficiency of hotel companies" (Osmanagić Bedenik, 1999, p. 359).

The quality of labor input into tourism, as tourism is very labor-intensive, is of great importance. Educated, qualified, and motivated employees are imperative in tourism development planning. Investments in tourism should be aimed at both improving the quality of tourism infrastructure and improving the quality of human capital. It should be borne in mind that human capital is created in the long run and is the result of coordinated efforts of institutions, tourism companies, and employees themselves. Previous research has confirmed theoretical assumptions about the impact of human capital variables on labor productivity in tourism (Blake, Sinclair, & Soria, 2006; Li & Prescott, 2010). Research particularly highlights the importance of education and training, the age structure and loyalty of employees, and satisfaction with their productivity.

Labor Productivity Analysis as an Indicator of Business Success

Labor productivity is a key indicator of business success, since the level of labor productivity depends on the cost of production, and they determine the level of economy and profitability. Labor productivity stands out among other economic indicators because it is a significant indicator of the dynamics of development and

economic development, and it depends on the level of material wealth of the country and meeting the material needs of individual citizens. Research on the concept of labor productivity, influencing factors and measures to increase labor productivity is necessary and useful because it contributes to increasing economic performance and material wealth and well-being of society as a whole.

Improving productivity is a major concern of any profit-oriented organization because it represents the efficient and effective conversion of resources into marketable products and the determination of business profitability (Wilcox et al., 2000). Consequently, considerable efforts have been made to understand the concept of productivity, with different approaches by researchers resulting in different definitions of productivity (Lema, 1995; Pilcher, 1997; Oglesby, 2002). Productivity is generally defined as the ratio of output to input.

The definition of productivity is derived from the basic economic principle: to achieve the maximum result with minimum investment, which can be achieved in two ways (Sredić, 2009): by increasing the total mass of products and increasing labor productivity, society as a whole, both for businesses and individuals. With the growth of labor productivity, opportunities are created to produce a larger quantity of products in the same unit of time. Therefore, productivity growth in society means an increase in social wealth. The higher the productivity of labor, the more goods society has at its disposal and the needs of the population are met at a higher level, and productivity growth is a major factor in living standards and social progress. If the worker produces more, i.e., if his performance is greater, his income is also higher.

Productivity is defined as an indicator of business performance of an economic entity, i.e., an indicator of work efficiency at the micro level. Equally, labor productivity is measured at the macro level, i.e., at the level of a branch, activity, or country (Bartoluci, 2013). In order to manage productivity as a basis for increasing the efficiency and profitability of business, it is necessary to monitor it in all years of work and business, analyze the causes, and implement measures to improve productivity in each economic entity in tourism.

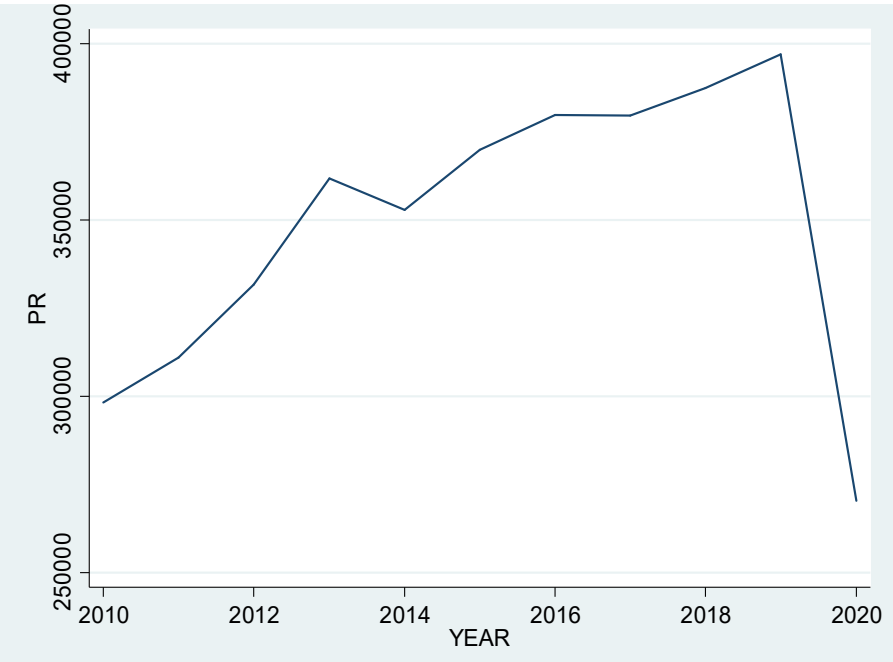

Figure 1. Analysis of labor productivity in the activity of accommodation and preparation and serving of food and beverages.

Figure 1 shows the movement of labor productivity in the activity of accommodation and preparation and serving of food and beverages in the period from 2010 to 2020 (a total of 11 years). At the very beginning of the observed period, labor productivity, which was calculated as the ratio of total income to the number of employees, amounted to HRK 298,293.7, while at the end of the observed period it amounted to HRK 270,340.5. If we compare the base year with the last year, we do not see a big drop in value. Labor productivity increased over the years, and peaked in 2019 when it amounted to 397,018.5 Kuna, which is an increase of 75% compared to 2010. After 2019, there was a sharp decline in labor productivity, when it was the lowest and amounted to 270,340.5 Kuna (a decrease of about 68% compared to the previous 2019). Monitoring labor productivity is a complex process because a number of external and internal, fixed, variable, and other factors affect productivity. The most important factor that affects productivity and even labor productivity is management, the manager and his role in the company, in addition to employees, standards, quality, and so on, to represent the so-called fixed factors. Some fixed factors, such as standards, can rarely be changed by managers because they are predefined. In contrast, training and employees are factors that can be more easily managed and are therefore important when it comes to productivity and the desire to increase it. Variable factors such as rewards, motivation, labor costs, etc., are more easily managed by managers and thus directly and strongly influence hotel productivity. E.g., the introduction of new information technology will improve communication and decision-making based on more easily accessible information. By environment we mean factors that are outside the hotel company and affect its productivity, such as the state, politics, tax system, etc.

Work is a fundamental factor of any business process. Management of work and human resources is an increasingly important task of modern business systems management in every activity, especially in activities in which it has a dominant role.

Cost Management

Cost management can be defined as achieving business goals based on optimal costs in certain business conditions (Pavlović & Škrtić, 1997).

The main goal of cost management is to achieve the optimal relationship between invested resources and the achieved result. The importance of costs in the economy is great because by rationalizing the consumption of elements the business process can achieve higher business results in conditions of increasing competition, when supply exceeds demand and when opportunities to increase sales prices are limited. Timely and relevant information is necessary for cost management, the preparation of which must be based on the chosen approach, system, and method of cost calculation. Cost reduction should not be approached linearly, but only unnecessary costs should be removed, and these are those related to activities that do not contribute to the creation of new value.

Due to the seasonal nature of business in the activity of accommodation and preparation and serving of food and beverages, especially important information on the effects of costs on changing the level of employment or the degree of capacity utilization, it is the division of costs into variable and fixed. In providing this information, it is important to realize that managers of lower hierarchical levels can significantly influence only those costs that rise and fall with the change in employment, and are related to business decisions that affect business results in the short term.

Variable costs are those costs that increase and decrease in total with the increase and decrease of the employment rate (Bartoluci, 2013). Information on the amount of average variable costs per unit of output is particularly important in making business decisions on whether it is justified within the existing capacity to produce and provide new products and services and thus enrich its offer or the offer of the location where the business entity is located.

Fixed costs are those that do not change in the total amount within the accounting period, i.e., do not react to the employment rate (Peršić & Janković, 2006). Fixed cost management means creating the preconditions for their amount to be distributed to as many products and services as possible, which can be provided in one accounting period, i.e., fixed costs are relatively reduced per unit of performance with increasing employment rates.

The management of fixed and variable costs should be based on the realization that with the increase in the degree of capacity utilization, the meaning of fixed costs relatively decreases, and the meaning of variable costs relatively increases (Majcen, 1976).

Methodology and Data

The subject of this study is the business of companies in the field of accommodation and preparation and serving of food and beverages in the Republic of Croatia, which in the observed period from 2010 to 2020 submitted the Annual Financial Statements. The business data used in the model were obtained from the Financial Agency (FINA). In order to prove and test the hypothesis "Operating costs have a negative impact on labor productivity", two regression models were implemented.

In the first regression model, the dependent variable is labor productivity (PR), while the independent variables are operating expenses: material costs (MT), staff costs (TO), financial expenses (FR), and depreciation (AM).

Due to the lack of significance between the dependent variable labor productivity and staff costs, the authors conducted another regression model in which the dependent variable is the same as in the first module, while the independent variables are staff costs: wages and salaries (PN), tax costs and wage contribution (TPD), and wage contribution costs (TDP).

Results of the First Model: Labor Productivity and Operating Costs in the Activity of Accommodation Services

Table 1 shows the descriptive statistics of the variables used in the model. Display the minimum value, maximum value, standard deviation, and arithmetic mean of all variables

Table 1

Descriptive Statistics of Dependent and Independent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
PR	11	349,101.7	40,972.65	270,340.5	397,018.5
MT	11	9,286,990,389	2,765,308,117	5,821,328,506	14,068,390,471
TO	11	4,972,649,729	1,333,397,933	3,494,235,600	7,372,641,061
FR	11	504,361,022	165,303,664	322,268,700	794,727,183
AM	11	2,552,928,386	615,867,597.8	1,866,064,137	3,493,988,030

Source: Author's calculation based on FINA data.

In Table 1 we see that the dependent variable labor productivity in the observed period amounted to HRK 349,101.7. The minimum value was HRK 270,340.5, while the maximum was HRK 397,018.5. Material operating costs ranged from HRK 5,821,328,506 minimum to HRK 14,068,380,471 maximum. The average value of staff costs in the observed period amounted to HRK 4,972,649,729, while the average value of financial expenses was extremely lower compared to other operating expenses and amounted to HRK 504,361,022. Depreciation expense ranged from HRK 1,866,064,137 to HRK 3,493,988,030.

After descriptive statistics, the Pearson correlation coefficient was calculated. The Pearson correlation coefficient measures the strength and direction of the linear correlation. The results of the correlation analysis are shown in Table 2.

Table 2

Correlation Analysis of Dependent and Independent Variables

	Labor productivity	Material costs	Staff costs	Financial expenses	Amortization
Labor productivity	1.0000				
Material costs	0.7246	1.0000			
Staff costs	0.5892	0.9830	1.0000		
Financial expenses	-0.6060	-0.8821	-0.8729	1.0000	
Amortization	0.2928	0.8588	0.9294	-0.8611	1.0000

Source: Author's calculation based on FINA data.

Table 2 shows the existence of significant and in some cases high positive correlations between variables. The dependent variable labor productivity has a positive significant correlation with material costs and staff costs, while it has a negative significant correlation with financial expenses. It has a slight association with depreciation. Among the independent variables, the largest positive significant correlation occurs between staff costs and material costs (0.9830), while a negative significant correlation occurs between material costs and financial operating expenses (-0.8821), and between the variables staff costs and financial expenses (-0.8729).

The regression equation is:

$$lnPRO_{cons} = 24.79451 + 0.5964265_{lnMT} + 0.1527365_{lnTO} - 0.3943629_{lnFR} - 0.9625885_{lnAM}$$

The results of multiple linear regression indicate the existence of sensitivity of labor productivity to the costs incurred in the company's operations. The variable material costs proved to be statistically significant ($p = 0.060$). If there is an increase in material costs by 1, labor productivity will also increase by 0.5964265 Kuna. Furthermore, financial expenditures proved to be statistically significant ($p < 0.05$); however their growth will have a negative impact on labor productivity. An increase in financial expenses by 1 will reduce labor productivity by HRK 0.3943629. Depreciation costs have a statistically significant and negative impact on labor productivity, because their growth by 1 will reduce labor productivity by HRK 0.9625885. Personnel costs did not prove to be statistically significant ($p > 10\%$) and in this model they are considered to have no impact on labor productivity in the company.

The coefficient of determination of the set model of multiple regression is R ^ 2 = 0.9848, which means that the model interpreted 98.48% of all deviations. That is, operating costs explain 97.47% of the variance in the labor productivity variable. The model confirms the hypothesis and based on the results it is concluded that labor productivity is sensitive to changes in costs within the company's operations.

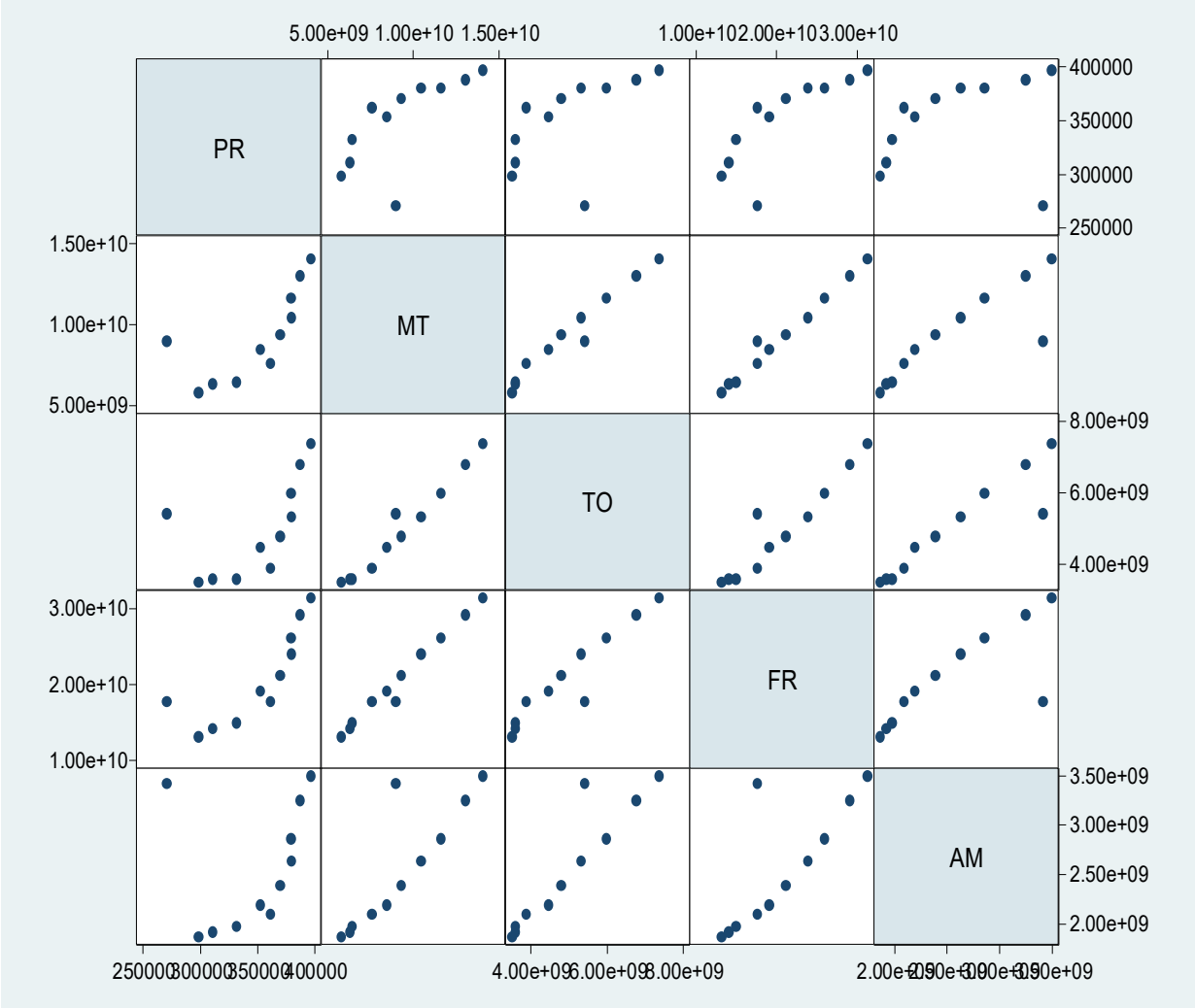

Figure 2. Graph matrix of dependent and independent variables.

Table 3

Results of the Regression Analysis of the Sensitivity of Labor Productivity to Operating Costs

lnPROD	Coef.	Std. Err.	T	P > t	[95% Conf.	Interval]
lnMT	0.5964265	0.2582309	2.31	0.060	-0.0354417	1.228295
lnTO	0.1527365	0.3695061	0.41	0.694	-0.7514123	1.056885
LnFR	-0.3943629	0.143031	-2.76	0.033	-0.7443473	-0.0443786
lnAM	-0.9625885	0.1965717	-4.90	0.003	-1.443582	-0.4815949
_cons	24.79451	5.194383	4.77	0.003	12.08431	37.5047
Obs	11					
R-squared	0.9848					
Adj R-sq.	0.9747					
F-statistics	97.28					

Source: Author's calculation based on FINA data.

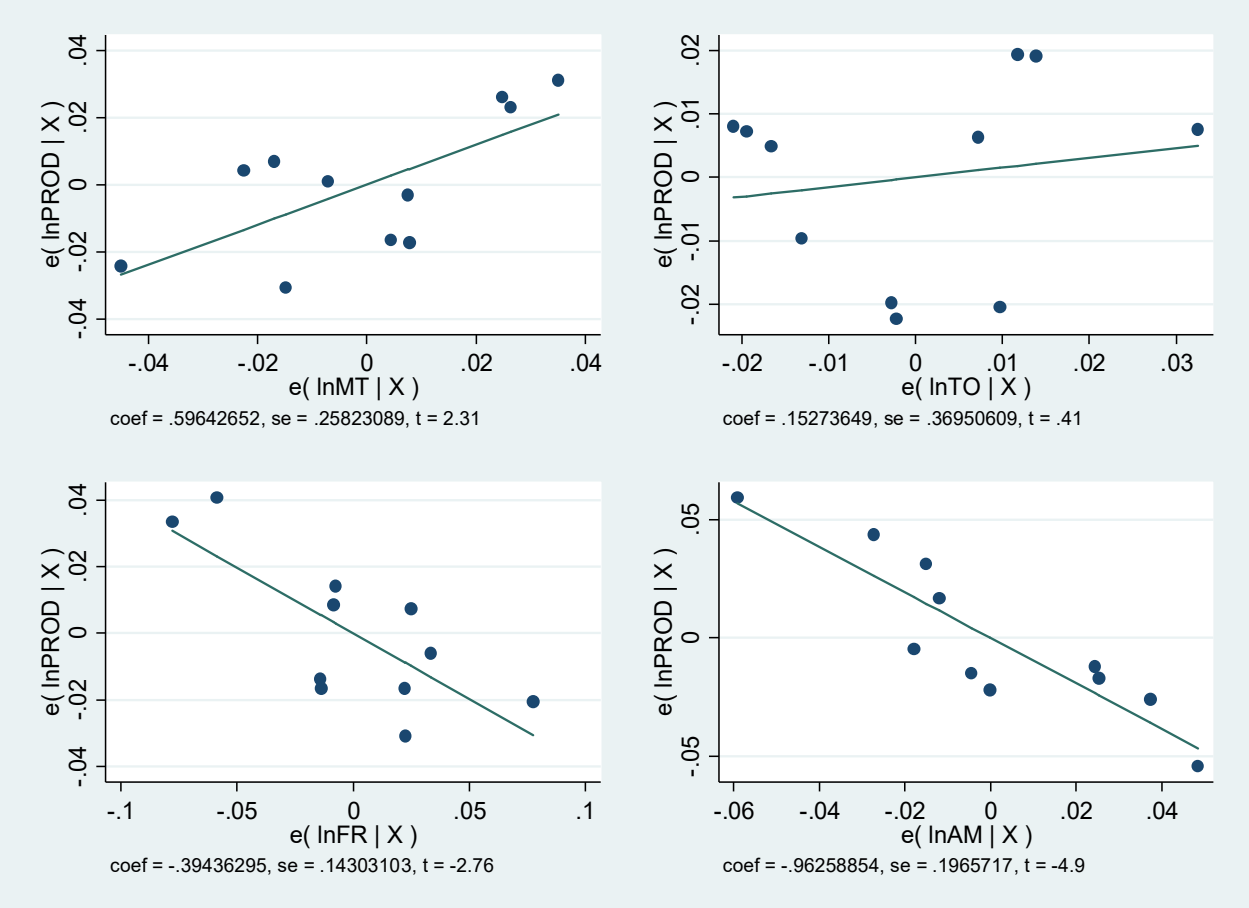

Figure 3. Regression diagnostic added-variable plots first model.

Results of the Second Model: Sensitivity of Labor Productivity to Staff Costs

Table 4 shows the arithmetic mean, standard deviation, minimum and maximum value of the variables. The dependent variable labor productivity in the observed period (11 years in total) ranged from a minimum of HRK 270,340.5 to a maximum of HRK 397,018.5. In the total staff cost, the most represented are the cost of net salaries and wages, whose average value amounted to HRK 3,171,099,257, followed by the cost of contributions and taxes from salaries, which ranged from HRK 821,418,433 minimum to HRK 1,660,089,502 maximum. The cost of salary contributions was the least represented, amounting to an average of HRK 666,045,818 in the observed period.

Table 4

Descriptive Statistics of Dependent and Independent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
PR	11	349,101.7	40,972.65	270,340.5	397,018.5
NP	11	3,171,099,257	896,957,554.2	2,163,428,511	4,793,301,030
TPD	11	1,135,504,653	285,971,524.7	821,418,433	1,660,089,502
TDP	11	666,045,818	158,141,313.8	480,252,926	919,250,529

Source: Author's calculation based on FINA data.

The results of the correlation analysis are shown in Table 5. The existence of significant and in some cases high positive correlations between the observed results is visible. The dependent variable labor productivity has a positive significant correlation with all variables in the model. It is highest with the cost of taxes and contributions from wages (0.6738), followed by contributions to wages (0.6606), while the lowest but equally strong correlation is present with the variable net wages and salaries (0.5446). Furthermore, a strong correlation is present for all independent variables; the largest positive correlation occurs between net wages and salaries and the cost of taxes and wage contributions (0.9818), while the smallest but also positive and significant correlation occurs between the cost of net wages and salaries and the cost of wage contributions (0.9654).

Table 5

Correlation Analysis of Dependent and Independent Variables

	Labor productivity	Net wages and salaries	Cost of taxes and contributions	Income contributions
Labor productivity	1.0000			
Net wages and salaries	0.5446	1.0000		
Cost of taxes and contributions	0.6738	0.9818	1.0000	
Income contributions	0.6606	0.9654	0.9850	1.0000

Source: Author's calculation based on FINA data.

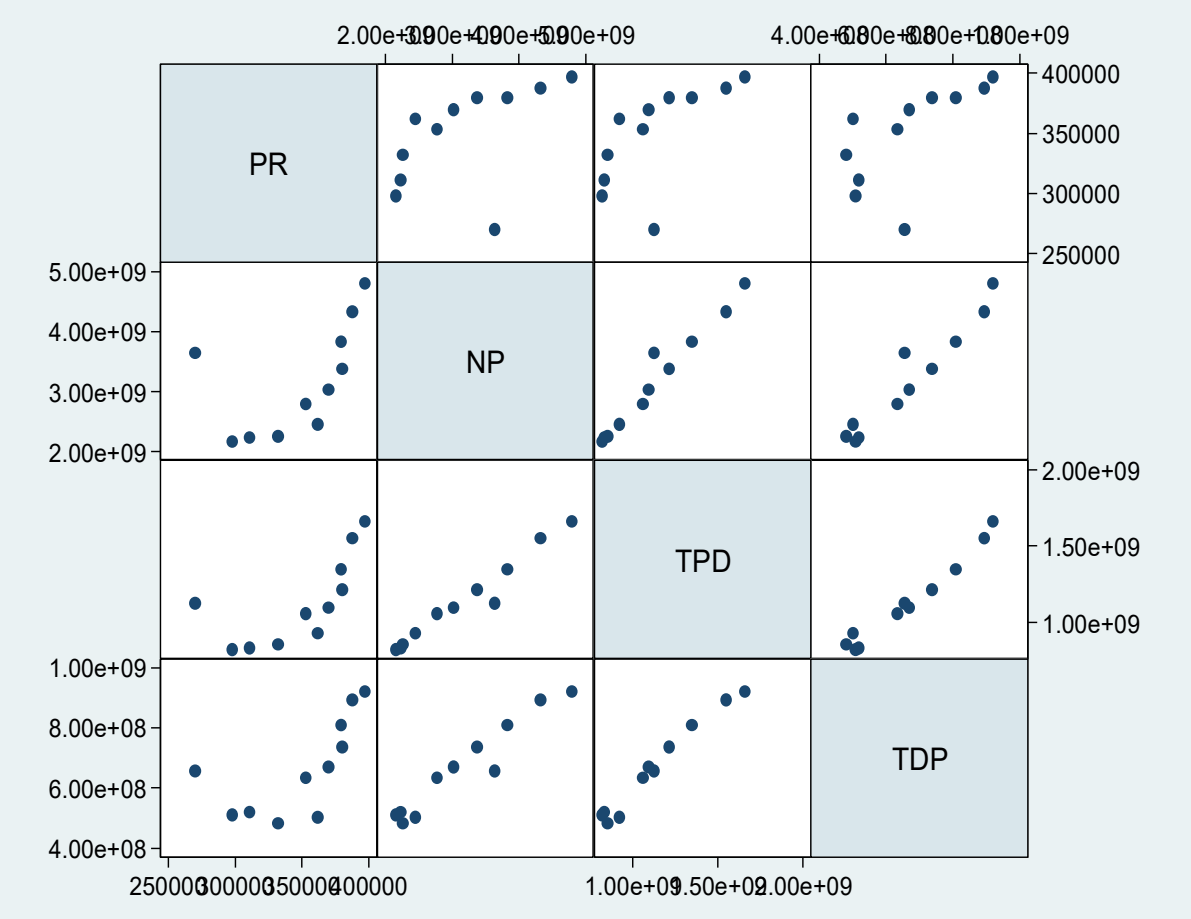

Figure 4. Graph matrix of dependent and independent variables.

Table 6

Regression Analysis of Labor Productivity Sensitivity to Staff Costs

lnPROD	Coef.	Std. Err.	T	P > t	[95% Conf.	Interval]
lnPL	-1.575097	0.3424162	-4.60	0.002	-2.384782	-0.7654112
lnTPD	2.359228	0.5418971	4.35	0.003	1.077845	3.640611
lnTDP	-0.2819877	0.3931232	-0.72	0.496	-1.211576	0.647601
_cons	3.75554	1.619553	2.32	0.053	-0.0740945	7.585174
Obs	11					
R-sq.	0.8549					
Adj R-sq.	0.7927					
F-stat.	13.75					

Source: Author's calculation based on FINA data.

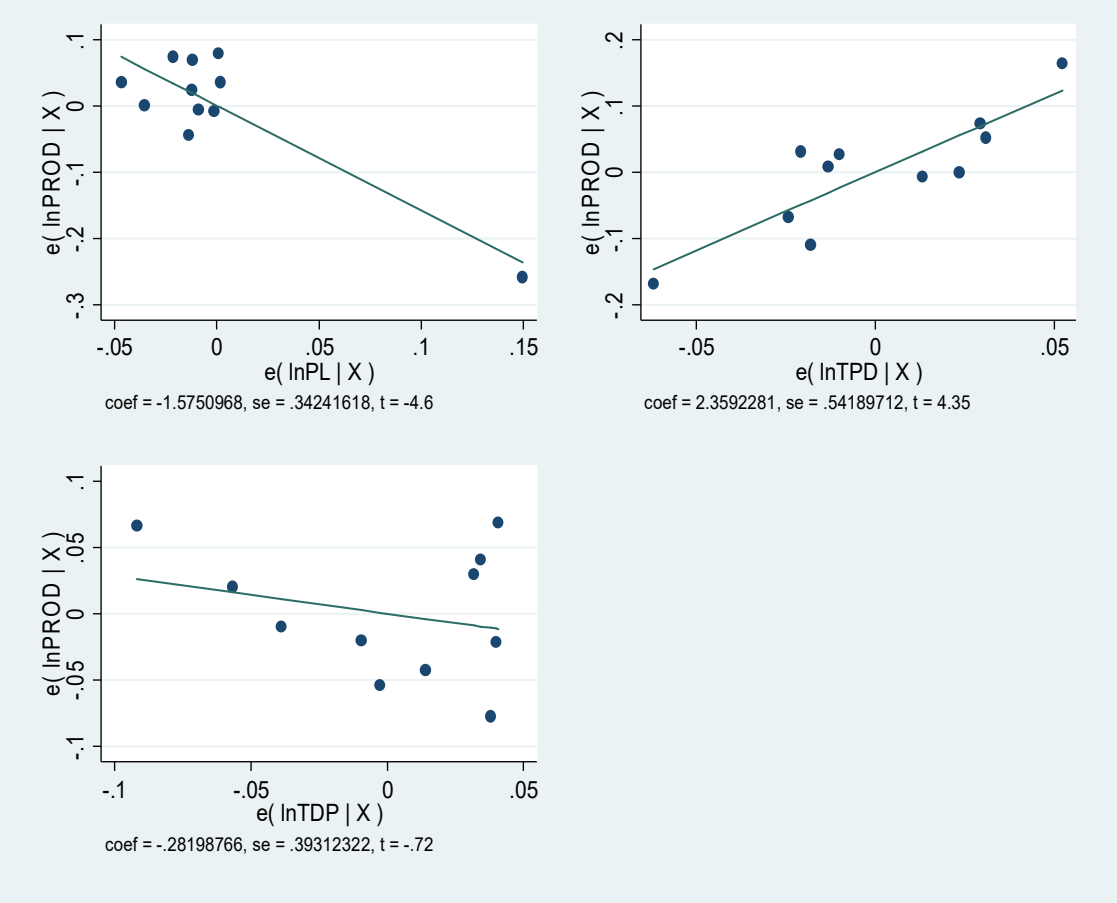

Figure 5. Regression diagnostic added-variable plots second model.

Multiple linear regression equation

$$lnPROD_{cons} = 3.75554 - 1.575097_{lnPL} + 2.359228._{lnTPD} - 0.2819877_{lnTDP}$$

The results of multiple linear regression confirm the sensitivity of labor productivity to the incurred staff costs in the company's operations. Net wages and salaries proved to be statistically significant (t = 0.002). They will have a negative impact on labor productivity; with their growth, productivity will decrease by HRK 1.575097. Furthermore, the variable cost of taxes and contributions from salaries proved to be positive and

statistically significant, at a significance level of 5%. An increase in the cost of taxes and contributions from salaries by 1 will result in an increase in labor productivity by HRK 2.359228. The variable cost of wage contributions did not prove to be statistically significant, and in this model it does not show that it has an impact on labor productivity. The model explains 79.27% of the variance in staff costs in the dependent variable labor productivity. The results of multiple regression of the set model confirm the set hypothesis that labor productivity in the company is sensitive to the incurred staff costs.

Paying for work in any business organization is one of the most complex economic and social problems. Therefore, special attention is paid to the distribution of salaries in tourism business organizations. The distribution system is based on legislation, the essence of which is that everyone has the right to equal pay for equal work. Every business organization must establish a payroll management policy, which must be clearly formulated in order for the payroll system to be credible among employees. If the salary management policy is poorly designed or does not exist at all, the salary system is fraught with many irregularities, and employee dissatisfaction negatively affects business results (Galetić & Pavić, 1996).

Conclusion

Labor productivity is one of the fundamental indicators of business performance, economic development, and the country's wealth. For this reason, it is necessary to continuously research, analyze, and point out measures and opportunities to increase labor productivity. This is especially emphasized in the service sector as a labor-intensive activity with a very high share of direct contact of employees with guests.

The results of the analysis show the sensitivity of labor productivity to the incurred operating costs. The hypothesis was partially accepted because some operating costs proved to be positively significant. The results of the first regression model showed that if there is an increase in material costs, labor productivity will also increase. Furthermore, financial expenditures have proven to be statistically significant; however, their growth will have a negative impact on labor productivity. Depreciation costs have a statistically significant and negative impact on labor productivity. In the second regression model, net wages and salaries proved to be statistically significant. It will have a negative impact on labor productivity. Furthermore, the variable cost of taxes and contributions from salaries proved to be positive and statistically significant, at a significance level of 5%. The variable cost of wage contributions did not prove statistically significant.

One of the limitations of this research is the sample size and future research should be based on a larger sample.

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